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TANGANYIKA TERRITORY

Annual Report
of the
Medical Department
for the year ended 31st December
1947

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TANGANYIKA TERRITORY

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STAFF

During the past year the staff position has improved slightly. Eleven Medical Officers were recruited who rather more than made up for retirements, and it proved possible to increase the staff at certain stations and to open the long promised hospital at Mondul in Masailand.

Six new Health Inspectors helped somewhat to relieve the shortage on that side of the Department. Twenty Nursing Sisters arrived, but since wastage was of very much the same order, no extension of services was possible. A second Woman Administrative Assistant and a Woman Nutrition Officer were appointed during the year and stationed in Dar es Salaam. Dr. A. W. Williams of Uganda was appointed Medical Specialist and posted to the European Hospital, Dar es Salaam. Dr. A. V. Clemmey was appointed from the local service as Ophthalmic Specialist and stationed at Tanga. Drs. Edmundson, Chilton and Spicer (from Uganda) were promoted to Senior Medical Officers, the latter two being stationed at Mwanza and Lindi respectively.

Owing to lack of Senior Medical Officers and senior staff suited to undertake administrative duties, the Northern and Tanga Provinces and the Central and Western Provinces were combined, each under one Provincial Medical Officer, and extra clerical staff were posted to their headquarters to cope with the resulting increase of paper work.

Dr. Ross Innes, who had been appointed as Inter-territorial Leprosy Specialist, arrived in Tanganyika in June and made an extended safari to the various leper settlements in the Territory. One of his main objects was to discover suitable sites among infected populations for an extensive trial of the Sulphone group of drugs which it is hoped will revolutionize the treatment of leprosy. He intends to recommend the establishment of one or more central leper hospitals where treatable cases will be admitted for a limited period and intensive treatment with these new drugs undertaken. It is not expected that incurable lepers will be maintained here but that as in other hospitals the sick will be cured and return to a more or less normal life. Dr. Ross Innes left Tanganyika to continue his investigations in Uganda and Kenya, and his final report and recommendations are still awaited.

RESEARCH

The year showed the initiation of several long-scale programmes of research. Dr. Muirhead Thomson, who had studied on the West Coast the bionomics of *Anopheles gambiæ* and *Anopheles melas*, arrived in Dar es Salaam to continue his researches here. He had found that *A. melas*, which was a species distinct from *A. gambiæ*, bred in fresh water among the mangrove swamps of tidal estuaries and was an important vector of malaria. It was known that upon this coast dark forms of a mosquito closely resembling *A. gambiæ* were found breeding in saline waters, and the problem was to discover whether *A. melas* was also distributed on the East Coast, or whether the dark forms were a variation of the ubiquitous *A. gambiæ*.

The work is so far incomplete, but to date it appears almost certain that *A. melas* is not found on the East Coast, but that *A. gambiæ* undergoes a darkening when it adapts itself to saline waters. This research is still in progress.

Following his visit in 1946, the late Professor McSwiney wrote a report upon research generally in East Africa, in the course of which he suggested that before it was possible to change the present bias of curative medicine to a more strictly preventive one, it would be necessary that both some basic survey of the causes of African ill-health and experimental work for the amelioration of this should be undertaken. Accordingly he recommended as follows :—

> "To establish preventive medicine in the territories of East Africa, which must of necessity be a long term policy, it is recommended that development be considered in five stages :
>
> *Stage I.*—A medical and sanitary survey.
>
> *Stage II.*—The application of measures to improve health in the area surveyed.
>
> *Stage III.*—The extension of Stage II to a larger area.
>
> *Stage IV.*—The maintenance of established conditions.
>
> *Stage V.*—The review of conditions from time to time in the light of new discoveries."

He recommended that Stage I be undertaken forthwith.

In October 1947 Professor Macdonald of the London School of Hygiene and Tropical Medicine visited the Territory to select a site where operations should commence. He was attracted by the Sukumaland area where there exists a rich tribe and a dense population and where, on account of the exhaustion of the soil, rehabilitation measures are being undertaken by the Agricultural Department and the Administration to instruct the people in better methods of agriculture and animal husbandry, and to induce them to spread away from the heavily congested areas into more thinly populated lands.

In connection with this scheme a very careful agricultural and social survey has been undertaken, and Professor Macdonald felt that the basic medical survey recommended by Professor McSwiney could suitably operate in connection with that. It is intended later to try out methods which more properly come under Stage II in the same areas.

Two members of this proposed survey team had already arrived by the end of the year and were engaged upon preparatory work.

Professor Macdonald, during his visit, explained the principles of this survey at the conference of Provincial Medical Officers, and in the discussion which followed answered many queries in connection with this and other schemes.

Dr. F. Hawking and Dr. Mahaffy, both of the Colonial Medical Research Committee, visited the Territory to discuss more general matters of medical research.

COMMITTEES AND CONFERENCES

Advisory Committee on Public Health

The second annual meeting of the Advisory Committee on Public Health was held in April, when it was agreed that meetings need not be held six-monthly as previously resolved, but should take place at least once a year. Deliberations included consideration of memoranda submitted by members, and of various government reports and papers, as well as problems of permanent medical and health concern such as nutrition, venereal disease, malaria control, and the relation of the health services to education, agriculture, and the general administrative and economic policy of the Territory. Representatives of the Education and Agricultural Departments were invited to attend relevant parts of the discussion, and many of the opinions and recommendations recorded were further discussed by Senior Medical Officers at their conference later in the year.

Provincial Medical Officers' Conference

The third conference of Provincial Medical Officers was held at the beginning of November, but owing to sickness and vacancies in the post of Senior Medical Officer, only four out of the eight provinces were represented. A wide range of subjects was discussed, from small details about the layout of medical forms and the design of uniforms, to major matters of territorial policy. The inter-territorial Leprologist, the Medical Specialist Labour Department, the Matron-in-Chief and the Pharmacist attended during the discussion of items on which their special knowledge would be of value.

Standardization of Hospital Equipment Sub-Committee

This sub-committee held a number of meetings during the year, and reported to the Provincial Medical Officers' Conference in November. A classification of hospitals into four grades according to staff and beddage was drawn up, together with full lists of equipment, apparatus and furniture required for a grade II or 100-bedded African hospital, to be scaled up or down for other grades, and also a standard form for returns. The sub-committee recommended that a Standing Committee on the subject should be appointed, and on the endorsement of Provincial Medical Officers this was set up at the end of the year, composed of the Surgical Specialist, Medical Specialist, Matron-in-Chief and Pharmacist, its terms of reference being to report regularly on the state of equipment in the Territory, to maintain schedules of the standard equipment required, and to advise on the purchase of new items as necessary.

Medical Grants-in-Aid to Missions Advisory Committee

The first meeting of this committee was held in June, mission bodies being represented by members of the Universities Mission to Central Africa and the Augustana Lutheran Mission. The need was stressed for increasing co-operation between Government and missions in the medical field where their aims were substantially the same, and both Government and mission members expressed the hope that the new committee might be instrumental in promoting this. Discussion was concerned mainly with details of the regulations published in 1946 regarding grants, which, it was agreed, could for some years be based on numbers of qualified staff only, since inspectorial staff was not available for assessment of buildings and Government itself was only in process of laying down set standards of equipment. Various interim amendments to the regulations were recommended for submission to Government, and recommendations were made for allocation of the sum voted under the head of "Grants-in-Aid to Missions".

Hospital Welfare Committees, Dar es Salaam

The Sewa Haji Hospital Welfare Committee met regularly every month throughout the year, and as a result of its recommendations a number of improvements have been made for the comfort and well-being of patients, both in the general amenities of the hospital and with regard to diet. The committee also investigated complaints made by individuals and other bodies about the treatment and care of African patients.

Only two meetings were held by the European Hospital Welfare Committee, in February and in April. Recommendations regarding the insect-proofing of mosquito-nets and the installation of call-bells and bedside lights were carried out before the end of the year.

Library Committee

The Library Committee at Headquarters met regularly during the first three months of the year, and again in June and November. Expenditure on new books for Headquarters and on periodicals was the main subject of discussion at the earlier meetings, and the purchase of books to complete the establishment of provincial libraries at the later ones. Co-operation between the committee and the Librarian of the Medical Research Laboratory in Nairobi grew up during the year for the purpose of exchanging facilities whenever feasible, and the assistance of the Provincial Medical Officers' Conference was invited in suggesting books to be bought both for their own and for the Headquarters' library.

URBAN WORK AND HOSPITALS

The figures of attendances at the government hospitals for the year 1947 again show an increase. This year 912,836 out-patients were treated as against 875,410 last year, while the figures for in-patients are 70,404 as against 69,901 in 1946.

No enlargement of hospital facilities has been possible during this year nor at present is it desirable. Our hospitals are still suffering from the lack of maintenance inevitably associated with the war years, and before extension should take place, it is considered that general improvement, especially among those more remotely situated, should have precedence. Some small improvement on these lines has been possible, but like most work in this Territory, has been handicapped by lack of materials and construction staff.

In Dar es Salaam two Specialists are now stationed, one Medical and one Surgical. Medical Officers have been appointed to both the European and Sewa Haji hospitals in charge of most of the routine work who are able to seek guidance and advice when required from their more senior colleagues. The appointment of a senior officer to a post analogous to that of Medical Superintendent of a hospital to undertake the administrative work has been continued and proved successful.

The new Maternity and Child Welfare Clinic was opened during the year and placed under the charge of a Woman Medical Officer. It is staffed by a Health Visitor and a Nurse.

At Tanga some improvement in fabric and staffing has been possible. New equipment has arrived and is in process of installation. The Ophthalmic Specialist has been appointed as officer in charge of the hospital and is assisted by two Medical Officers, one of whom holds a higher degree in surgery and has been able to raise materially the standard of surgical work in Tanga.

With the increased number of patients and the higher standard of attention that the Department has endeavoured to give, the drug situation has at times been somewhat difficult. Supplies are now arriving from the United Kingdom, but the stocks have not always been fully maintained, and the increased cost coupled with the necessity for budgeting ahead has caused frequent temporary difficulties.

In Mwanza a propaganda service has been instituted to explain to Africans the *raison d'être* of some of the more unpopular of the Township Rules, and it is hoped in this way to achieve a greater sense of civic responsibility. A Hospital Welfare Committee with similar terms of reference to those operating in Dar es Salaam was also set up in Mwanza.

More towns are accepting local responsibility for public health services, Tabora and Dodoma being the last two to do so. These township authorities are thus now responsibile for the township cleansing, a duty formerly undertaken by the public health side of the Medical Department.

A determined effort to tackle mosquito breeding in urban areas was made in the Southern Highlands Province during the year. Cultivation round Mbeya has decreased the extent of breeding places there, but Iringa still suffers from the proximity of the Little Ruaha with its mass of swamps which are very difficult to control.

RURAL WORK AND NATIVE AUTHORITY SERVICES

Further work in planning the Sukumaland Rural Health Service was done during the year, and although no active measures have been taken, the plan is sufficiently far advanced for detailed estimates and arrangements to be submitted. It is hoped that this scheme, which will co-operate closely with the Basic Health Survey mentioned above, will prove an outstanding example in the application of preventive medicine to a rural African population.

The Mobile Health Unit established in the Tanga Province, to which reference was made in the last annual report, has now been attached to the Rehabilitation Scheme in the Mlalo Basin, where again pressure of population is exhausting the soil. New land here is only available at lower altitudes, and close attention by the medical authorities is necessary if serious outbreaks of malaria are to be avoided. One such outbreak among the non-immune African population occurred during the year in the Mbulu District, where owing to various factors including peasant movement from higher to lower levels, and possibly to abnormal climatic conditions and upward extension of the mosquito vector, a serious epidemic of malaria occurred. Extra supplies of anti-malaria drugs were despatched as soon as the position was reported and the epidemic quickly subsided.

Table 11 shows the distribution of Native Authority dispensaries throughout the Territory by provinces. There is an apparent increase of twenty-seven dispensaries over the figures for the previous year. This is in part made up by sleeping sickness dispensaries originally established by Government during the progress of an epidemic, which, now the epidemic has subsided, have been taken over by the Native Authorities and are performing general medical work. There have, however, been a large number of new dispensaries established in Masailand, mostly of a very low grade, and generally in charge of part-time dressers only. This system is necessary among nomadic people such as the Masai who congregate together only for such periods as when cattle markets are held. The problem of medical services in Masailand is receiving the attention of the officer newly appointed to Mondul, and it is hoped to work out some general scheme in the near future.

MISSION MEDICAL WORK

The meeting of the Advisory Committee on Grants-in-Aid to Missions has been mentioned earlier in this report. Following the institution of these grants-in-aid, the missions have been requested to submit brief annual reports of part-time dressers only. This system is necessary among nomadic people from Government Medical Officers. Since this is the first year these reports have been asked for, their returns are not unexpectedly incomplete, and it is probable that the true figures are considerably in excess of those given. Several missions undertake medical work although they have no registered medical practitioner in charge. In most cases they have state registered nurses or midwives, but frequently their staff has only had a rough training in medicine and the work is less of a medical than of a first aid character.

As will be noticed from table 9, a considerable volume of maternity and child welfare work is performed at missions. In the majority of these cases stress is laid more upon the maternity side than on the welfare, but in some missions where better trained staff is employed, considerable progress can be reported on the welfare side also. Some missions devote considerable effort to this service, notably the C.M.S. and the Augustana Lutherans in the Central Province, the Moravians in the Western Province and the White Fathers in the Lake Province.

MATERNITY AND CHILD WELFARE SERVICES

During the year a new clinic in Dar es Salaam was opened. This is a large building containing ante-natal and post-natal beds with separate accommodation for septic cases—all four classes housed in separate buildings on the pavilion system connected by covered ways.

There is an out-patient and administration block, labour rooms and a nursery. The clinic has been placed under the care of Dr. E. Jackson, who is attempting to change what was in the past very largely an out-patient service for sick women and children into its proper function of maternity and child welfare, with an increasing emphasis on the welfare aspect. Women are being encouraged more and more to bring their children for examination at the clinic even though they are not obviously ill, and a considerable response has been achieved. This has necessarily meant that time could not be found for the treatment of general diseases among women and children, and accordingly these are now directed to attend clinics at the main hospital in Dar es Salaam.

Staffing has proved rather difficult owing to shortage of nurses, and frequent changes have made the task of training African ayahs an extremely hard one.

Up-country, considerable interest has been shown by the lay public in maternity and child welfare work. The Women's Service League has in many places assisted in instituting small clinics where simple advice may be given to expectant and nursing mothers. Some communities have used the proceeds of charitable funds to obtain small buildings for this purpose. The government medical staff have assisted where possible, but shortages have made it impossible officially to appoint staff for such work.

The Senior Medical Officer, Southern Highlands, puts a very strong case for institutional delivery of parturient African women. Owing to overcrowding in their homes, to say nothing of tribal custom, he considers a medical responsibility exists for detribalized women in townships. He stresses the point that the mothers of to-day are the midwives of to-morrow, and that the influence on them of properly conducted labour in hospital may tend to eradicate the painful and useless procedures practised in tribal areas.

The desire of the African for attention during childbirth illustrates well the need for the institution of a village midwife service. Women trained largely on rule of thumb methods who are available for work in the homes of the people and in rural clinics are required. The training for this type of person need not be so thorough as that required for institutional midwifery, and in fact in the present state of education in the Territory it is impossible to find more than a minimum number of girls who are capable of benefitting by a prolonged and intensive training. Efforts to produce the village midwife are being made in the Lake Province with the help of the Sumve Mission, and they will first be employed on the Sukumaland Development Scheme.

TUBERCULOSIS HOSPITAL, KIBONGOTO

The Specialist in charge of the Tuberculosis Hospital at Kibongoto has defined the work of the unit as follows :—

> ''Tuberculosis control on Kilimanjaro comprises the work of :—
>
> (a) A chain of dispensaries round the mountain.
>
> (b) The Hospital-Sanatorium at Kibongoto.
>
> (c) The Settlement.
>
> ''Visiting the homes of known infectious cases, and instructing them in personal hygiene; examining their contacts; endeavouring to obtain cases while they are still at an early stage; keeping in touch with and treating cases discharged from the hospital-sanatorium : these are the aims and functions of the tuberculosis dispensary.
>
> ''The hospital-sanatorium itself, to which suspicious cases are brought in from the dispensaries, examines and assesses the condition of these cases and decides whether treatment has to be in-patient or out-patient. If out-patient, the cases concerned are returned home and cared for through the nearest dispensary to their homes : if in-patient, treatment is initiated in the hospital and continued there until they are well enough to carry on through the dispensary. Any complication arising during out-patient treatment is referred to the hospital for adjustment and old patients also come into hospital from time to time to have their condition assessed.

"The whole question of treatment and prevention depends on the smooth running of both the dispensaries and the hospital-sanatorium, which are absolutely dependent on each other and are under one unified staff."

The work of the hospital is thus primarily concerned with the local Chagga, the tribe inhabiting the slopes of Kilimanjaro. Africans and Asians from other parts of the Territory where there are no arrangements for after-treatment in their own districts are being referred in increasing numbers to Kibongoto. The majority of these are advanced cases and the results of treatment among them are at first sight poorer than among the Chagga. A careful analysis shows that though the prognosis in the case of the Chagga is much better than among other tribes, this is not due to any inherent or even developed resistance to the disease but merely to the opportunity for early diagnosis and follow-up treatment that the mountain scheme offers. The Tuberculosis Specialist concludes from this that: "A hospital-sanatorium is useless if it is isolated. It must be based on an area which is known to have a tuberculosis problem and it must have a dispensary system working in that area." He therefore recommends that future policy should be gradually to extend the Kilimanjaro scheme to embrace other areas with Kibongoto acting as the hospital-sanatorium, as and when possible starting other schemes, tribal, district, provincial, or whatever size is found to be most suitable, but "avoiding the isolated hospital as one would the plague".

The work of the unit has increased year by year and the procedures employed have become more elaborate. The prognosis in advanced cases is improving: "When we first instituted pneumothorax therapy we selected cases very carefully. Now every pulmonary tuberculosis plus case that is not actually moribund receives either pneumothorax or pneumoperitoneum treatment, with or without a phrenic cut. Many are so advanced that we rate them at plus 4 instead of plus 3. It is therefore very gratifying to have as many as twenty-four of these advanced cases rendered sputum negative."

Total cases of Tuberculosis contacted or treated at Kibongoto during 1947

(This includes all in-patients, all out-patients treated and all old patients contacted.)

	Old		New		Total		Grand
Type	Male	Female	Male	Female	Male	Female	Tota
Pulmonary Tb plus	253	118	116	44	369	162	531
Pulmonary Tb minus	191	192	23	11	214	203	417
Lymphatic	338	333	30	49	368	382	750
Spinal	16	14	2	1	18	15	33
Bone and Joint	17	12	3	—	20	12	32
Skin	1	—	—	1	1	1	2
Chronic Disseminated	1	—	—	—	1	—	1
Total	817	669	174	106	991	775	1,766

MENTAL HOSPITALS

The numbers of patients for the year were as follows:—

Dodoma.—Total capacity: 214, of which ten are European.

	Males	Females	Total
Remaining at 1st January, 1947	129	41	170
Admitted during year	101	36	137
Transferred to Lutindi	6	6	12
Discharged	79	23	102
Died	11	3	14
Remaining at 31st December, 1947	134	45	179

Lutindi.—Total capacity : 150.

	Males	Females	Total
Admitted during year	25	13	38
Transferred to Dodoma	—	—	2
Discharged	—	—	12
Died	—	—	11
Remaining at 31st December, 1947	88	40	128

In March the After-Care Committee mentioned in last year's report was set up in Dar es Salaam to deal with cases discharged to that area, and the Welfare Officer has agreed that he and his staff might look after those discharged to other parts of the Territory.

The rate of discharge from Dodoma, as compared with admissions, has continued to improve :

	1945	1946	1947
Admitted	130	136	137
Discharged	73	88	102
% Discharges	56·2	64·7	74·4

MALARIOLOGIST

The Malariologist was absent from the Territory on leave from the 1st May till the end of December.

New staff has been recruited and the Malaria Unit is being set up at Muheza where it has taken over the buildings formerly used by European staff, Muheza hospital having been degraded to the status of an S.A.S. hospital.

During the early part of the year further surveys were undertaken both of sisal estates and townships in various parts of the Territory.

NUTRITION

Miss H. M. Dewey, Nutrition Officer, arrived in September and started a short survey of feeding conditions among various sections of the African population in the Uzaramo District. This was designed to acquaint her with local customs and to act as a guide to further and more extensive surveys. It included the examination of school children and investigation of their feeding habits, and the compiling of family budgets among better and lower class native families in Dar es Salaam.

Miss Dewey also visited Mpwapwa in continuation of similar work.

TRAINING

Hospital Assistants

Increased accommodation was arranged at the students' hostel on the Kilwa Road to cope with the expected increase of students in 1948.

The number of Hospital Assistant students actually in training during 1947 was twenty first-year, of whom seven resigned before the end of the year, four second-year and seven third-year, of whom six qualified at the end of December and received the government certificate.

The classrooms in the Sewa Haji Hospital were improved and a raked lecture hall constructed. Some rearrangement of the syllabus was undertaken to lay more stress upon the practical side of teaching.

It was noticed that the general standard of the entrants is better than it has been during the past two or three years.

The school was consecutively under the charge of Drs. Farr, McKendrick and Thompson. It is hoped that the latter can be seconded permanently for tutorial duties.

LABORATORY ASSISTANTS

The syllabus of instruction for Laboratory Assistants was revised, and a certain amount of ward work was arranged during the first year, to be performed with the Hospital Assistant students.

Five students passed the final examination in December, and there were three second-year and two first-year students who completed the year's training.

NURSES AND MIDWIVES

The building of the hostel for nurses in training in Tanga has again been delayed, and in spite of the appointment of a Sister Tutor very little progress has been made, though fifteen nursing students were in training there during the year.

In Dar es Salaam the old clinic was taken over as a school, and some of the upper rooms of the Sewa Haji Hospital were used as hostel accommodation for girls in training from the secondary school in Tabora.

The Block system has continued, and nine students had qualified in this manner up to the end of 1947. The scheme has come in for a large amount of criticism, mainly directed to the lack of practical training. This is inevitable at present with our shortage of Nursing Sisters in up-country hospitals. The basis of the scheme is that theoretical training shall be given in Dar es Salaam during the Block periods and the practical work be continued in the districts. The multifarious duties of the few sisters we have been able to post in the district hospitals have made it impossible for them to set aside the time needed for the practical continuation work.

It is hoped that these are teething troubles and that with increased staff the system will prove of real value.

HEALTH OF LABOUR

The Medical Specialist attached to the Labour Department reports a continued improvement in housing upon estates, especially in the Tanga Province where some five thousand labour have been rehoused in permanent or semi-permanent camps of approved design. Lack of materials and the reluctance of the small employer to incur extra capital costs have prevented even greater improvement. Employers who interested themselves in the welfare of their labour are finding it more easy to attract recruits and that less time is lost on account of sickness.

During 1947, Williamson Diamonds, Ltd., drew up plans with the assistance of the Labour Department, for the complete rehousing of their labour. The proposed new compounds will be far in advance of anything previously provided for African labour in this country.

The Groundnut Organization commenced operation in the first quarter of 1947, the principal area being that in the Central Province (Kongwa). Owing to the lack of suitable local building materials and the need for speed in the erection of camp buildings, it was found necessary to permit the use of tentage on a very large scale. Various administrative difficulties were experienced at Kongwa in that the main base camp became very large and cumbersome to deal with. The Labour Department worked in close and constant co-operation with the officers in charge of the medical section of the scheme. In the Western Province area the need for tentage was not permanent as ample supplies of local building materials were available.

The feeding of labour up to the full scale of rations as laid down by Government has been difficult since supplies of certain items such as oil-carrying foods and meat have been irregular. Despite this the percentage of labour receiving full rations from their employers has increased, and the Medical Specialist notes that: "The general standard of fitness of labour receiving the full government ration scale appears to be higher than that of unfed labour or the African living independently on his own shamba. Most employers still issue dry rations, but in one or two areas communal feeding experiments were undertaken and proved successful."

An increase in the number of dispensaries attached to industrial undertakings is reported and some of the larger concerns have provided hospitals under the control of qualified medical personnel.

Owing to the system of daily inspections and early treatment of all cuts, abrasions and small wounds now adopted on a large number of estates, the ulcer rate is being considerably reduced. The Medical Officer in Morogoro, for instance, where the standards of medical attention are high, reports a decrease of the ulcer rate and attributes it to improved feeding and medical care on the plantations.

The scheme for examination of recruits related to a fixed set of physical standards was continued with satisfactory results. Modifications of the original scheme are now being made to remove some of the existing anomalies.

YELLOW FEVER SURVEYS

The sampling of blood for mouse protection tests was continued during 1947, 156 specimens being taken and despatched to the Yellow Fever Research Institute at Entebbe. Of these, specimens from two adult females and one adult male were found to be protective. During the previous year 128 bloods were sampled, three giving evidences of protection, making a total of 284 for the years 1946 and 1947. The details of those showing protection are as follows:—

	Province	District	Age	Sex	Date bled
1	Southern	Lindi	25	F	28.6.46
2	Southern	Lindi	21	F	29.6.46
3	Southern	Lindi	23	F	2.7.46
4	Tanga	Tanga	20	F	29.7.47
5	Tanga	Tanga	25	F	28.7.47
6	Northern	Moshi	20	M	26.9.47

The preponderance of immune females is due to the fact that sampling, especially during 1947, was largely confined to adult females and children of both sexes so as to eliminate as far as possible those who had travelled outside their districts and been infected or inoculated during their travels. It is significant that no children were found to be immune. All six immunes are, as far can be verified, untravelled and none has been inoculated. All results were confirmed.

A few other specimens gave inconclusive or immune results, but in each case either a second specimen proved to be negative or else closer enquiry revealed previous inoculation with yellow fever vaccine.

According to our records a diagnosis of yellow fever has never been confirmed in this Territory—the disease has never been recognized clinically or pathologically. To the best of our knowledge, the people from whom the immune bloods were taken have acquired their immunity indigenously and naturally, but as has been belatedly demonstrated in other cases, our enquiries are by no means always successful in eliciting an accurate previous history. On one occasion a medical officer took two immune specimens from schoolboys. Questioning had elicited no history of previous inoculation. Requestioning revealed that they had in fact been inoculated, and the medical officer was led to the conclusion that this extraordinary lapse of memory had been induced by the sight of a red aerated drink given to encourage the other blood donors.

The question: "Does yellow fever exist in the Territory?", remains unanswered. Our survey continues.

EPIDEMIC DISEASES

Smallpox

Territorial Incidence—(Notifications from all sources)

	1943	1944	1945	1946	1947
Cases	201	5,735	12,283	12,671	2,960
Deaths	2	38	1,815	1,935	616
% Fatality	1·0	0·7	14·8	15·3	20·7

Provincial Incidence

	1943	1944	1945	1946	1947
Central:					
Cases	—	1,594	1,336	1,725	489
Deaths	—	11	225	285	73
% Fatality	—	0·6	16·8	16·5	14·9
Eastern:					
Cases	6	625	186	440	42
Deaths	—	—	—	39	8
% Fatality	—	—	—	8·8	19·0
Lake:					
Cases	—	1,988	3,558	1,987	921
Deaths	—	13	405	497	220
% Fatality	—	0·6	11·4	25·0	23·9
Northern:					
Cases	88	339	106	129	22
Deaths	1	3	25	33	2
% Fatality	1·2	0·9	23·6	25·5	10·0
Southern:					
Cases	19	128	449	2,546	237
Deaths	1	8	11	160	30
% Fatality	5·3	6·2	2.5	6·3	12·7
Southern Highlands:					
Cases	—	195	3,081	1,692	832
Deaths	—	—	93	426	243
% Fatality	—	—	3·0	25·2	29·2
Tanga:					
Cases	47	502	50	97	51
Deaths	—	2	—	18	10
% Fatality	—	0·4	—	18·5	19·6
Western:					
Cases	41	364	3,517	4,055	386
Deaths	—	1	1,056	477	30
% Fatality	—	0·3	30·0	11·7	7·8

The epidemic prevalence of this disease, which has been an outstanding feature in this Territory since 1944, has shown signs of abatement during the year, but the residual case fatality continued to appreciate in most provinces.

It should be realized that our notifications of this disease are by no means as accurate as notifications of deaths from the disease. On occasion the occurrence of a small but highly fatal outbreak in a remote locality is shown after further investigation to be a large outbreak with a far lower mortality.

During 1947, 2,080,600 doses of vaccine lymph were issued, compared with 2,530,700 in 1946. Improvements were made in the methods of transport to the outlying districts but it is still obvious that a considerable proportion has lost its potency before it is used. For example in a controlled series of primary vaccinations in the Lake Province only sixteen per cent of satisfactory reactions were obtained. In 1929, with poorer transport arrangements, a ninety-six per cent success rate was achieved with locally-produced lymph. The Senior Pathologist considers it essential, if we are to control this disease, that we should again be in a position to supply an unlimited quantity of high potency vaccine lymph that can withstand the local rigours of climate and transport and still produce a high protection rate among those vaccinated.

CEREBRO-SPINAL MENINGITIS

Territorial Incidence—(Notifications from all sources)

	1943	1944	1945	1946	1947
Cases ...	8,800 ...	3,463 ...	2,537 ...	1,789 ...	1,614
Deaths ...	1,395 ...	645 ...	546 ...	448 ...	380
% Fatality ...	15·8 ...	18·6 ...	21·5 ...	25·0 ...	23·5

Provincial Incidence

Province	Cases	Deaths	%Fatality
Central	55 ...	9 ...	16·4
Eastern	72 ...	12 ...	16·7
Lake	842 ...	219 ...	26·0
Northern	7 ...	3 ...	42·9
Southern	146 ...	16 ...	11·0
,, Highlands	93 ...	16 ...	17·2
Tanga	34 ...	17 ...	50·0
Western	365 ...	88 ...	24·1

The case incidence and deaths from this disease continue to decrease and the case mortality, although still high, shows the first decrease for five years.

HUMAN TRYPANOSOMIASIS

Territorial Incidence—(Notifications from all sources)

	1943	1944	1945	1946	1947
Cases ...	439 ...	825 ...	546 ...	806 ...	653
Deaths ...	181 ...	232 ...	154 ...	221 ...	196
% Fatality ...	41·5 ...	27·3 ...	28·2 ...	27·4 ...	30·0

Provincial Incidence

	1945		1946		1947	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Central Province Total	13	5	164	8	209	16
Kondoa-Irangi	3	1	154	6	196	13
Singida (Mkalama)	10	4	10	2	13	3
Eastern Province Total	25	6	12	34	42	16
Ulanga	25	6	12	34	42	16
Lake Province Total	76	12	101	11	61	8
Biharamulo	34	8	51	11	41	7
Musoma	33	2	46	0	17	0
Mwanza	9	2	4	0	3	1
Northern Province Total	86	12	158	22	48	15
Mbulu	86	12	158	22	48	15
Southern Province Total	35	17	34	10	38	11
Kilwa (Liwale)	0	6	1	0	9	3
Lindi	0	0	0	0	1	1
Masasi	10	5	7	1	7	4
Songea	2	0	2	0	3	0
Tunduru	23	6	24	9	18	3
S. Highlands Province Total	1	0	4	0	1	0
Chunya	1	0	4	0	1	0
Western Province Total	310	101	333	136	254	130
Buha	138	49	104	71	76	56
Kahama	113	43	143	52	98	29
Kigoma	0	0	0	0	1	1
Tabora	59	9	86	12	79	44
Ufipa	0	1	0	1	0	0
Total	546	154	806	221	653	196

On the 1st January, 1947, the transfer of Settlement Officers and Sleeping Sickness Surveyors to the Provincial Administration was completed, marking the end of the Department's responsibility for the administrative, agronomic and social aspects of resettlement, a work which it had carried out, not without success, for a quarter of a century.

The total number of cases of sleeping sickness reported in 1947 shows a reduction of nearly twenty per cent as compared with 1946, in spite of the continuance of the Kondoa outbreak and a recrudescence in Ulanga and eastern Tabora south of the central railway.

Central Province: Kondoa-Irangi.

There was an increase in the number of Kondoa cases. The majority were infected in the bush west of the Bubu river but there has been a spread into Usandawe around the Kwa Mtoro road. A survey of the Bubu area early in the year accurately determined the extent of the infected area and estimated the number of people at risk.

The country between the Bubu and Kondoa boma is eroded and over-populated and the pressure caused by these factors had driven many people across the river into the bush which is densely infested with tsetse. There they had settled in tiny villages of two or three houses in close contact with fly which were found even inside the huts. The first cases were found in July

1946 but in spite of the large number of people infected since then, there is still a great lack of awareness of the cause of the disease and the benefits of early treatment. The trypanosome here seems to be less virulent than we have been accustomed to see it, and almost afebrile patients with repeatedly negative bloods have been common so that the diagnosis is only confirmed by examination of the cerebro-spinal fluid.

A great deal of bush clearing has been done on the west bank of the Bubu by the Department of Tsetse Reclamation and ample fly-free land is now available for all the dwellers in the infected area. Resettlement has, however, been very slow and it must be recorded that in 1947 we failed to control the outbreak. Clearing which is followed only by an invitation to "come in and settle sometime" is of no avail. The big epidemics in the Western Province were controlled by concentration followed by clearing, not clearing followed by concentration or half-hearted resettlement.

Eastern Province : Ulanga.

There has been a marked increase in the Ulanga cases due to a not unexpected flare-up in the Mkasu area. Deaths were reported in July and by the end of the year thirty-five new cases with twelve deaths had been notified. Scouts were employed to find the sick in their villages and a treatment centre established at Boma ya Lindi. Elsewhere in Ulanga sleeping sickness was not active.

Northern Province : Mbulu.

Fewer cases were reported than in any year since the beginning of the outbreak in 1944. Only fifteen per cent of the cases occurred in females, indicating that the people as a whole no longer live in close contact with the fly, the disease having largely become an occupational hazard of hunters, honey-gatherers, travellers, etc.

Western Province.

The number of cases diagnosed in the Western Province was the lowest for five years but nevertheless over forty per cent of all the cases reported from the whole Territory were from this Province. The percentage of females was seventeen and this is an indication of the success of the settlements in protecting the general population against sleeping sickness. Some of these settlements are now more than twenty years old and still agriculturally sound, and cattle are to be found thriving in a number of them.

Buha.—This district was the site of the last large-scale epidemic in the Territory and it is gratifying that cases show a continuing reduction, being twenty-five per cent less than in 1946 and forty-five per cent less than in 1945.

Kahama.—An unexpected fall in the number of cases reported occurred. Runzewe is the black spot in this district being responsible for thirty-seven per cent of all cases reported. It was thought that an extensive resettlement would have to be undertaken to make the size of the settlement conform to the number of people living there. A scheme was prepared which would have meant the abandonment of a mission, and a reasonable case against this was put up by both the District Commissioner and the missionaries. It was decided to undertake several small resettlements and to clear bush and to review the situation after two years. A good deal of work has been done and it is hoped that a great reduction in cases will be achieved.

Tabora.—Although the number of cases was lower than in 1946, there has been a small but disquieting outbreak in Ugunda and Ngulu.

ENDEMIC DISEASES

MALARIA AND BLACKWATER FEVER

Malaria

	1943	1944	1945	1946	1947
Out-patients	79,239	85,968	93,928	96,326	118,738
In-patients	9,903	9,667	10,778	10,631	13,962
Deaths (In-patients)	139	184	183	192	264
% Fatality	1·4	1·8	1·6	1·8	1·9

Blackwater Fever

	1943	1944	1945	1946	1947
Out-patients	23	31	13	10	8
In-patients	90	72	46	54	38
Deaths (In-patients)	15	21	13	9	12
% Fatality	16·67	29·18	28·26	16·67	31·5

The malaria incidence rose during the year in all provinces except the Eastern. The Senior Medical Officer, Dar es Salaam, noted a decrease in cases at the Sewa Haji Hospital, and attributed it to the rigorous anti-malarial works maintained by the public health services in the town. There were two main major epidemics of the disease in the Territory, one in Mbulu in the Northern Province, and another of much smaller dimensions in the Bukoba District of the Lake Province. Both these epidemics necessitated the transference of European Medical Officers to cope with the outbreaks, which rapidly subsided under vigorous therapeutic measures. In spite of the increase in the number of cases notified, the death rate from malaria remains comparatively low.

Unfortunately, the same cannot be said of blackwater fever, where, although the actual number of cases dropped, the mortality rose though not significantly.

RELAPSING FEVER

	1943	1944	1945	1946	1947
Out-patients	2,441	2,951	2,998	3,844	3,605
In-patients	1,333	1,683	1,815	1,926	1,694
Deaths (In-patients)	25	38	33	32	27
% Fatality	1·9	2·3	1·8	1·6	1·5

The territorial decrease in cases of relapsing fever is reflected in the fatality. With the increased use of D.D.T. and Gammexane this should in the future prove to be a disappearing disease in towns and places where active public health measures can be initiated and controlled. The Senior Medical Officer, Lake Province, stated that the majority of cases occurred in the towns. An increase in the number of cases in the Tanga Province was traced to a heavy infestation in the Korogwe area. The Medical Officer, Morogoro, reported that despite energetic measures adopted in labour camps and by employers of large groups of labour in that area, the numbers remained much the same as in the previous year, due to reinfestation by fresh labour arriving carrying the ticks with them. On the other hand, following the anti-tick measures adopted by the Medical Officer of Health, Dar es Salaam, the number of cases attending the Sewa Haji Hospital decreased.

SCHISTOSOMIASIS

	1943	1944	1945	1946	1947
Out-patients	12,020	8,747	10,324	10,671	9,217
In-patients	669	452	474	672	620
Deaths (In-patients)	12	13	3	5	10
% Fatality	1·79	2·88	·68	·74	1·6

Most of the cases of schistosomiasis treated in Dar es Salaam come from outside the township area. The Senior Medical Officer, Tanga, notes that the infection fluctuates from village to village but there is no general infestation. In the Lake Province 3·9 per cent of all cases treated in Mwanza during the year suffered from this disease, the numbers for Ngudu running second with 2·9 per cent. The southern side of Lake Victoria seems the more heavily infected and rice-growing seems to be one of the chief factors in transmission. A note of warning is sounded by the Senior Medical Officer of that region regarding the increased irrigation resulting from the construction of dams in the Shanwa and Ngudu districts, which in the future may possibly play a somewhat sinister role in spite of their benefits to agriculture.

ANKYLOSTOMIASIS

	1943	1944	1945	1946	1947
Out-patients	20,398	21,630	20,556	25,327	23,720
In-patients	2,009	2,089	2,113	2,509	2,633
Deaths (In-patients)	148	124	151	142	152
% Fatality	7·35	5·95	7·15	5·65	5·77

The year shows a slight decrease in total numbers, but the fatality rate remains much the same. The Senior Medical Officer, Lake Province, considers that little reliance can be placed on the figures, owing to the multiplicity of general intestinal infestations. With this remark few who have intimate knowledge of the Territory will quarrel. So frequently cases are found during the course of routine examinations, who have attended hospital seeking advice for other conditions. The infestation in the Lake Province seems to be greater nearer the lake shore, becoming gradually less intense further inland. The only exception to this is found in the two mining areas.

The Senior Medical Officer, Dar es Salaam, considers that more Africans are infested with this parasite than are free of it, judging from the numbers found to be infected though presenting no actual signs nor symptoms.

THE DYSENTERIES

Amœbic

	1943	1944	1945	1946	1947
Out-patients	795	616	279	496	692
In-patients	215	408	171	254	259
Deaths (In-patients)	16	26	10	11	21
% Fatality	7·5	6·4	5·8	4·3	7·3

Bacillary

	1943	1944	1945	1946	1947
Out-patients	285	1,085	674	550	603
In-patients	242	566	302	281	151
Deaths (In-patients)	66	95	32	31	16
% Fatality	27·7	16·8	10·6	11·3	10·6

Dysenteries Unclassified

	1943	1944	1945	1946	1947
Out-patients	2,180	2,919	1,960	2,161	2,395
In-patients	533	784	544	457	295
Deaths (In-patients)	77	109	41	45	22
% Fatality	14·5	14·0	7·5	9·6	7·5

These figures show a very true picture, it is considered, for this group of diseases. With the increasing use of Sulphaguanidine it is hoped that the improvement shown in the fatality percentage, although small, will be maintained.

THE ENTERIC FEVERS

	1943	1944	1945	1946	1947
Out-patients	12	90	14	26	74
In-patients	132	214	203	302	291
Deaths (In-patients)	24	27	43	38	46
% Fatality	18·2	12·6	21·2	12·6	15·4

No major epidemic of any of the diseases in this group was reported during the year.

The opinion expressed in last year's report regarding the fallibility of diagnosis in the absence of adequate laboratory facilities dispersed throughout the Territory still holds good, but with the increasing number of trained African laboratory assistants passing out from the training school it is hoped that it will be possible to place greater reliance on the figures in future years. The Senior Medical Officer, Tanga, reported a total of forty-four cases with seven deaths in Tanga town and district, but the source of this infection remained undiscovered.

VENEREAL DISEASES AND YAWS

Syphilis

	1943	1944	1945	1946	1947
Out-patients	44,256	35,644	38,614	37,486	38,897
In-patients	1,669	1,637	1,705	1,868	2,364

Gonorrhœa

Out-patients	15,325	14,915	15,699	16,928	20,059
In-patients	1,905	2,221	2,982	2,864	2,414

The Senior Medical Officer, Lake Province, noted that venereal diseases are responsible, in some areas, for more casualties than malaria. Ngara with its comparative freedom (syphilis ·03 per cent of cases, gonorrhœa ·04 per cent) is in contrast to Bukoba where 7·8 per cent of total cases are syphilitic infections and 8·5 per cent gonococcal, and to Ikoma with the figures of 19·4 per cent syphilis and 3·6 per cent gonorrhœa. Intelligent leaders of African thought are showing considerable concern over the spread of these diseases in Sukumaland, with its dense and shifting population. The question of the part played by lack of tribal discipline in abetting the spread and by the exercise of it as a means of reduction would seem to be worthy of exploration. The Senior Medical Officer, Tanga, regrets that although curative methods are available, unfortunately so far there has been no systematized attempt at venereal disease control. He considers that the increase shown is a true reflection of the incidence of the disease. The Senior Medical Officer, Dar es Salaam, describes the running of the special venereal disease clinic at the Sewa Haji Hospital where experiments were made with penicillin in the treatment of gonorrhœa. The "one shot" method was tried at first, using as solvents saline, saline and patient's blood, and beeswax and peanut oil. This latter had to be abandoned owing to mechanical difficulties. The method finally adopted was that of one injection on two successive days of 100,000 units in saline, which was found to procure an eighty to eighty-five per cent cure for all cases. The previously-tried method of giving Sulpha drugs by the mouth had proved unsuccessful, as it was practically impossible to ensure that the African carried out the instructions given to him.

Yaws

	1943	1944	1945	1946	1947
Out-patients ...	78,350 ...	70,977 ...	68,446 ...	50,284 ...	60,052
In-patients ...	882 ...	914 ...	644 ...	975 ...	714

The standard treatment for yaws is still by intramuscular injection of Bismuth Sodium Tartarate. The injection is accompanied by considerable discomfort or pain and two or three treatments are the limit of what the African will accept. It is not claimed that this system has ever done much to cure the disease in the individual, but there is a vast body of evidence to show that a reduction both of the incidence and of the proportion of florid cases has been effected.

TUBERCULOSIS

Pulmonary

	1943	1944	1945	1946	1947
Out-patients ...	2,807 ...	2,312 ...	2,988 ..	2,915 ...	3,257
In-patients ...	722 ...	804 ...	886 ...	1,125 ...	983
Deaths (In-patients)	125 ...	171 ...	134 ...	199 ...	226
% Fatality	17·3 ...	21·3 ...	15·1 ...	17.7 ...	22·9

3257
983
1231
391
6267

Non-Pulmonary

	1943	1944	1945	1946	1947
Out-patients ...	1,267 ...	1,180 ...	1,832 ..	1,461 ...	1,731
In-patients ...	211 ...	217 ...	308 ...	332 ...	296
Deaths (In-patients)	17 ...	17 ...	17 ...	23 ...	19
% Fatality	8·1 ...	6·0 ...	5·5 ...	6·9 ...	6·4

Some concern has been expressed by the Senior Medical Officer, Lake Province, at the finding at autopsy of a suspected case of silicosis in an underground worker from Geita Gold Mine. Specimens forwarded to the South African Bureau of Medical Research were reported to be inconclusive. The possibility of miners' phthisis becoming a "major" health consideration amongst the mine-workers of this Territory, with its increasing mineral exploitation, is engaging the active attention of the Medical Specialist attached to the Labour Department. The Senior Medical Officer, Tanga, also expresses anxiety over the number of frank open cases of pulmonary tuberculosis seen at Tanga hospital, and he considers that the disease is on the increase there. The Senior Medical Officer, Dar es Salaam, in his report on the Infectious Diseases Hospital, gives a figure of 138 cases. This is almost fourteen per cent of the total number of in-patients for the whole Territory (excluding Kibongoto), and suggests that, as these cases are mainly from Dar es Salaam town and its suburbs, tuberculosis in the Tanganyika African is largely a disease of overcrowding and bad ventilation.

PNEUMONIA

	1943	1944	1945	1946	1947
In-patients ...	3,271 ...	3,167 ...	3,903 ...	3,996 ...	3,606
Deaths ...	338 ...	355 ...	420 ...	334 ...	333
% Fatality	10·3 ...	11·2 ...	10·7 ...	8·3 ...	9·17

The Senior Medical Officers of both the Tanga and the Southern Highlands Provinces consider this disease the most fatal of all from which the African suffers. The latter considers further that were communications easier in his province an even greater incidence would be shown, for he is of the opinion that many more cases occur, and have a fatal result, than are brought to hospital, owing to the lack of transport to bring the sufferers into the towns and of adequate roads to permit medical officers to reach patients in the outlying districts.

THE PRINCIPAL LETHAL DISEASES

In-Patients

Disease	No. of Cases	No. of Deaths	Disease Fatality Rate per cent
Malaria and Blackwater Fever	14,000	276	1·9
Pneumonia	3,606	333	9·2
Ankylostomiasis	2,633	152	5·8
Dysentery and Enteritis	2,076	167	8·0
Relapsing Fever	1,694	27	1·7
Pulmonary Tuberculosis	986	226	22·9
The Anæmias	441	73	16·6
Cerebro-Spinal Meningitis	315	145	46·0
Human Trypanosomiasis	313	28	8·9
Non-Pulmonary Tuberculosis	296	19	6·4
The Enteric Fevers	291	46	15·8
Smallpox	288	39	13·5

DENTAL DIVISION

Statement of work done during the year

Station	Attendances	Fillings	Extractions	Scalings	X-Rays	Dentures	Repairs
Dar es Salaam	4,102	1,177	2,626	377	407	273	155
Tanga*	1,745	598	1,278	251	57	43	12
Tabora	688	315	259	88	—	16	5

*The Tanga return is for official patients and Africans only from 8th April, 1947, to 31st December, 1947, and does not include three weeks' work done in Dar es Salaam by the Tanga Dental Surgeon during October.

MEDICAL STORES

Value of Receipts and Issues for the past three years are as follows :—

	Receipts			Issues		
	£	Shs	Cts	£	Shs	Cts
1945	111,663	3	81	96,479	11	56
1946	90,190	11	67	103,954	11	08
1947	75,057	10	88	85,735	11	12

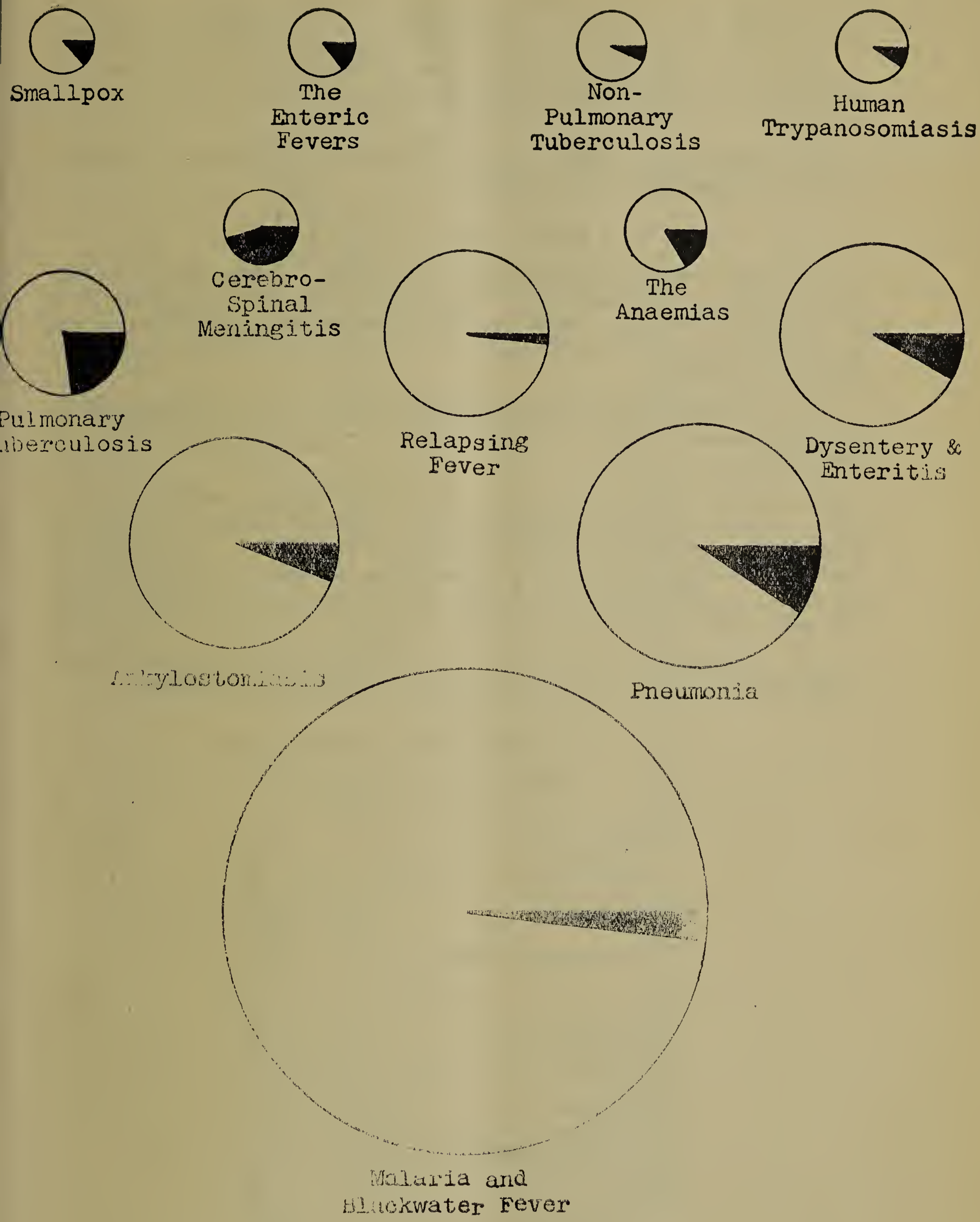
The value of stock on hand 31st December, 1947, was £65,330 0s. 73cts.

The value of receipts and issues for 1947 dropped considerably since we did not supply non-government concerns to the extent we did during the war years.

A total of 6,664 rail packages were sent from Medical Stores and 1,608 post packages.

With some exceptions such as crockery, enamel iron-ware, special types of instruments and equipment, the receipt of medical supplies has been very good considering the difficulties at home.

Mr. C. E. Thomas has been in charge of the Pharmaceutical Laboratory since Mr. Dodsworth resigned. The value of galenicals received from the laboratory during 1947 was £7,025 14s. 31cts.


Smallpox
The Enteric Fevers
Non-Pulmonary Tuberculosis
Human Trypanosomiasis
Cerebro-Spinal Meningitis
The Anaemias
Pulmonary
uberculosis
Relapsing Fever
Dysentery & Enteritis
Ankylostomiasis
Pneumonia
Malaria and Blackwater Fever

In March Mr. C. H. Cook was appointed Stores Accountant and took over from Mr. S. C. Cox who was then posted to the Sewa Haji Hospital.

Mr. E. W. R. Parks, Assistant Pharmacist, arrived in December and was posted to the Sewa Haji Hospital to relieve Mr. Cox who was due to go on leave.

The Pharmacist visited Tanga, Northern and Southern Highlands Provinces towards the end of the year.

LABORATORY DIVISION

The Senior Pathologist visited the Medical Research Laboratory in Nairobi from the 14th to 17th January, the visit being undertaken in order to study the scope and methods of laboratory procedures as practised in Kenya, and also with the object of negotiating for the purchase of regular supplies of biological products.

Mr. Marshall, Laboratory Superintendent, made a tour of inspection of the district laboratories in the Central and Western Provinces from the 12th to 25th August.

The Acting Assistant Director of Medical Services accompanied by Mr. Telling, Laboratory Superintendent, visited Bukoba in July to investigate a suspected outbreak of typhoid. Bacteriological apparatus and media were taken and a full investigation performed. No pathogenic organisms were isolated by blood culture or examinations of fæces or urine, nor were agglutination tests for enteric, dysentery or undulant fever positive.

The conclusions were that the severity of the epidemic had been grossly exaggerated and that it was due to a local exacerbation of malaria.

LABORATORY HEADQUARTERS, DAR ES SALAAM

ROUTINE EXAMINATIONS

BLOOD FILMS :

Malaria parasites	1,237
Microfilariæ	6
Spirillum duttoni	11
Total positive	1,264
Total negative	6,059
Total specimens examined	7,323

STOOLS :

Hookworm ova	525
Ascaris ova	26
Tænia ova	7
Trichuris ova	24
Oxyuris	3
Strongyloides	17
Flagellates	16
Schistosoma mansoni	3
E. histolytica	8
E. coli	20
Total positive	649
Total negative	1,371
Total specimens examined	2,020

URINE :

Schistosoma hæmatobium	260
Total negative	796
Total specimens examined	1,056

URINES—GENERAL EXAMINATION :

Albumen	440
Glucose	74
Acetone	12
Bile	15
Erythrocytes	264
Pus	1,332
Hyaline casts	6
Granular casts	20
Cellular casts	2
Total normals	1,088
Total specimens examined	3,253

STOOLS :

Erythrocytes	160
Pus cells	263
Other cells	86
Occult Blood	34
Total specimens examined	543

SPUTUM :

M. tuberculosis	166
Total negative	304
Total specimens examined	470

NASAL SMEARS :

M. lepræ	91
Total negative	229
Total specimens examined	320

DARK GROUND EXAMINATIONS :

Treponema pallidum	23
Total negative	44
Total specimens examined	67

OTHER BLOOD EXAMINATIONS :

Total cell counts	302
Hæmoglobin	474
Differential cell counts	229
Reticulocyte counts	17
Punctate basophilia	12
Bone marrow smears	2
Blood grouping and cross matching ...	69
Sedimentation rates	36
Total specimens examined	1,141
Grand Total specimens examined in Routine Section	16,193

SEROLOGY

Table showing Results of Wassermann and Kahn Tests, 1947

Sera examined by both Wassermann and Kahn:

Total number examined	1,668
W.R. / Kahn Positive	628
W.R. Positive / Kahn Negative	18
W.R. Negative / Kahn Positive	68
W.R. Negative / Kahn Doubtful Reaction	15
W.R. / Kahn Doubtful Reaction	7
W.R. Doubtful Reaction / Kahn Positive	18
W.R. / Kahn Negative	912

Sera examined by Kahn test only:

Total number examined	509
Positive	206
Negative	278
Doubtful	25

C.S.F. examined by Wassermann test:

Total number examined	56
Positive	6
Negative	49
Doubtful	1
Grand Total specimens examined ...	2,231

Total number positive ...	959
Total number negative ...	1,239
Total number doubtful reaction	33

AGGLUTINATION TESTS (WIDALS)

Total number of specimens examined ...	203

Presumptive positive results:—

Typhoid	34
Paratyphoid A	3
Paratyphoid B	0
Brucellosis	6
Weil-Felix Reaction	1
Negative	159

BACTERIOLOGY

This has now been organized as an independent section in charge of Mr. R. C. Telling.

Blood Cultures:

Total number examined	66
Salm. typhi isolated from	2
B. fæcalis alkaligenes isolated from ...	2

Fæces:

Total number examined	219
Salm. typhi isolated from	11
Sh. dysenteriæ (Flexner) isolated from	5

Urines:

Total number examined	172
B. coli isolated from	25

Swabs—Throat and Nose:

Total number examined	59
C. diphtheriæ isolated from	5
Str. pyogenes isolated from	2
Organisms of Vincent's Angina present	1

Two of the *C. diphtheriæ* proved to be of Mitis type.

Swabs from Skin Ulcers:

Total number examined	39
C. diphtheriæ Mitis isolated from	10
C. diphtheriæ Gravis isolated from	1
C. Xerosis isolated from	17
Str. pyogenes isolated from	10
Staphylococcus aureus isolated from	19
Ps. pyocyanea isolated from	3
B. fusiformis and *Trep. vincenti*	4

The *C. diphtheriæ* Gravis was isolated together with a Mitis strain from one swab.

The Gravis strain and four of the Mitis strains were inoculated intraperitoneally into guinea-pigs. All strains were avirulent to guinea-pigs.

Eye Swabs:

Total number examined	18
Staphylococcus aureus from	1

Ear Swabs:

Total number examined	9
Staphylococcus aureus isolated from	1
B. proteus isolated from	1
Ps. pyocyanea isolated from	4

Vaginal, Cervical and Urethral Swabs:

Total number examined	18
Monilia albicans isolated from	1

Pus (Various):

Total number examined	47
Staphylococcus aureus isolated from	21
Str. pyogenes isolated from	2
Ps. pyocyanea isolated from	2
B. proteus isolated from	2
B. fæcalis alkaligenes isolated from	2
Tubercle bacilli present in	1

C.S.F.:

Total number examined	27
Staphylococcus aureus isolated from	1
Pneumococcus isolated from	2
Bact. friedlanderi isolated from	1
Gram-ve *diplococcus*, resembling meningococcus which did not grow in culture	1

Pleural Fluids:

Total number examined	13
All were sterile in artificial cultures.	
Tubercle bacilli were not seen.	
Inoculated into guinea-pigs	7
Guinea-pigs positive for T.B.	1

Other Body Fluids:

Total number examined	40
Pneumococcus isolated from	3
Str. fæcalis isolated from	3
Ps. pyocyanea isolated from	1
Streptococcus (type unknown)	1

Sputa:

Total number cultured for organisms other than Tubercle bacilli ...	11

OTHER EXAMINATIONS

Foodstuffs for cleanliness and/or sterility tests:

Ugali	1
Butter (tinned)	1
Cheese	2
Honey	1
Fish (tinned)	1
Beans (tinned)	1
Carrots (tinned)	1
Ice-cream	2
Mineral waters	5
Total ...	15

Miscellaneous:

Skin and Nail parings for fungi ...	4
Specimens from septic tank ?typhoid	7
Swabs from spleen after postmortem ?typhoid	3
S. typhi was isolated from each swab.	
Liver and heart from rats ? *Past. pestis*	3
Water samples ?presence of algæ ...	5
Sample of brine ?sterility	1
Soda water bottles ?sterility	6
Total ...	29

Bacteriological Examination of Water:

Total number examined	300
Dar es Salaam main supply, number examined	277
Other sources, number examined ...	23
Grand total of specimens submitted for bacteriological examinations	1,082

BIOLOGICAL EXAMINATIONS

Guinea-pigs

Examination for *M. tuberculosis:*	
Positive	1
Negative	11
Examination for *Pasteurella pestis:*	
Positive	0
Negative	3
Diphtheria Virulence Tests :	
Positive	0
Negative	6
Examination for *Cl. tetani:*	
Positive	0
Negative	1
Other examinations	1
Total number of examinations	23

Rats

Total number of postmortem examinations performed 2,126

MORBID HISTOLOGY

During the year 348 specimens were received for morbid histology.

Organs of Digestion—46. Of these, twenty-three sections were from the liver of which eight showed a primary carcinoma. Of the ten specimens of appendix submitted for examination lesions were slight or absent. There was one primary carcinoma of the pancreas and four mixed parotid tumours. No specimen of malignant disease of the gastro-intestinal tract was received for examination.

Organs of Respiration—16. Of these, fifteen were undetermined types of broncho-pneumonia and one was a secondary carcinoma.

Female Organs of Generation—43. There were seven cases of carcinoma of the breast and seven of squamous carcinoma of the cervix uteri. Scrapings of the endometrium rarely provided evidence of value largely due to the almost complete absence of clinical details of the cases from which the specimens are collected. Three ovarian carcinomas and three ovarian cysts were examined.

Male Organs of Generation—22. Of thirteen prostatic sections eleven were adenomatous and two malignant.

Urinary Organs—19. Of five specimens of malignant disease of the kidney two were of the infantile sarcomatous type.

Skin.—86. Of these, nineteen were squamous carcinomata, six were malignant melanomata and there were three rodent ulcers all of which occurred in non-natives. It is of interest to note the rarity of rodent ulcer in the African whereas skin carcinomata are very common.

Lymphatic Glands—33. Eight cases of tuberculous glands were seen and four cases of Hodgkins disease. The majority of gland tissue sent for examination reveals a hyperplastic condition of an undetermined type.

Miscellaneous—83.

TOTAL NUMBER OF SPECIMENS EXAMINED IN MEDICAL LABORATORIES DURING THE YEAR 1947

Laboratory Headquarters	21,858
Sewa Haji Laboratory	40,238
Maternity Clinic	1,956
Morogoro	7,583
Dodoma	10,876
Tabora	25,595
Tanga	26,816
Moshi	17,528
Arusha	8,625
Lindi	8,270
Mbeya	9,483
Iringa	14,418
Mwanza	21,679
Bukoba	12,790
Musoma	16,167
Total ...	243,882

MEDICO-LEGAL

The following investigations were performed at the request of the Police :—

Examination of clothing for human blood stains	60
Examination of weapons for human blood stains	89
Miscellaneous examinations for human blood stains	12
Examination of bones and other animal remains	17
Examination of clothing for seminal stains	13
Examination of other exhibits for seminal stains	8
Examination of hairs	2
Blood grouping for medico-legal purposes	3

Forty-six postmortem examinations were performed at the request of the Coroner, the cause of death being as follows :—

Natural causes	19
Homicide	3
Drowning	5
Hanging (suicide)	4
Falls from a height	5
Road accidents	7
Accidental burial	2
Accidental burns	1

REPORT OF THE GOVERNMENT CHEMIST

The report of the Government Chemist follows. The Chemical Laboratory became a separate entity on the 1st January, 1948, attached to the Member for Agriculture and Natural Resources.

GENERAL

During the past year it was decided that a separate Department of the Government Chemist should be set up, incorporating both the staff of the Chemical Laboratory proper and the staff of the Tanganyika Industrial Committee. The latter committee still remains in being, and its functions are now more properly advisory, and such technical investigations as are required will be performed by the Government Chemist. The new arrangement should be both convenient and efficient, and although it comes into operation only from the 1st January, 1948, it will be convenient to deal in the present report with all the technical investigations, work and analyses carried out by what will be the staff of the Government Chemist.

The administration involved in the manufacture of Totaquina is not referred to in the present report since this factory has been closed down and its future is at present undecided. There will be the tabletting of Totaquina stocks to be completed during 1948, and responsibility for this will remain with the Government Chemist until the work is completed.

Owing to the promotion of the Assistant Government Chemist (Mr. W. Calton), to Government Chemist, Zanzibar, the only European member on duty for a large proportion of the year was Dr. Raymond. Mr. Payne arrived on first appointment as Assistant Government Chemist on 15th August, 1947, and on 8th November, 1947, Dr. Raymond proceeded on leave to the United Kingdom.

The shortage of European staff was naturally a handicap, and meant some sacrifice in the time available for teaching African Laboratory Assistants. It is hoped to make up tuition periods lost on the return of Dr. Raymond from home leave.

The present building is congested, and plans to replace the existing Laboratory by a new and larger building have again to be postponed owing to the general shortage of building materials and staff. Since there is no immediate prospect of starting on the new building, proposals have been made for a small temporary extension to cover more urgent immediate needs.

TRAINING OF AFRICAN CHEMICAL LABORATORY ASSISTANTS

As noted above, this work has been greatly curtailed during the year, but it was possible to hold examinations for the First and Second and Final year students. Three candidates presented themselves for the Final Examination, of whom two satisfied the examiners. Although two candidates satisfied the examiners, their course of training is, unfortunately, as yet incomplete, particularly in respect of the theoretical portions of their syllabus, but before they are eligible for further increments they will be required to pass a theoretical examination. The candidate who failed subsequently resigned.

Three second year students presented themselves for examination, and all passed.

Owing to the shortage of European staff, no further students are to be taken in training for 1948, but it should be possible to restart the scheme in 1949.

A scheme for Medical Laboratory Assistants, a short course in Biochemistry, was again postponed owing to the non-arrival of apparatus as well as shortage of staff. It may be possible to start this course next year.

ANALYTICAL WORK

The samples analysed during 1947 totalled 3,354 and can be classified as follows :—

Foods	
Milk	488
Condensed Milk	50
Ghee	12
Flour	159
Other foods	41
Drinks	
Water	259
Alcohol	74
Agricultural and Industrial Products	
Soap	43
Diamonds	187
Coins	18
Beeswax	102
Insecticides	99
Tobacco	4
Lime	14
Soils	119
Metal alloys	6
Cinchona bark	71
Totaquina	11
Oils	76
Papain	363
Gold	6
Cloths	78
Cement	15
Miscellaneous	63

Medicines

Non-native medicines	69
Native medicines	18

Forensic Exhibits

Viscera	92
Arrow poisons	42
Other exhibits	83

Clinical

Bloods	223
Urines	129
Gastric juice	210
Cerebro-Spinal fluid	126
Stool	13
Others	1

NOTES ON MATTERS OF INTEREST

Foods and Drugs.—Of the 488 milk samples examined, twelve were below standard, though not in all cases significantly so. A number of vendors were warned and one successfully prosecuted.

The acidity of flours and meals of various types was frequently under test throughout the year with emphasis on wheat flour. High acidity was a characteristic of many of these flours, due it is believed to unsatisfactory methods of storage and transport under conditions of prolonged exposure to high humidity. The trouble was confined mainly to the coastal area. On the other hand, poor baking technique and perhaps at times lack of good yeast may often have been more responsible for complaints than lack of quality in the original flour.

The method of determining and reporting acidity of flours varies widely among different authorities. Under these circumstances it is not surprising that difficulty is sometimes experienced in comparing local results with those elsewhere, and in interpreting the varying standards of maximum acidity recommended by different authors. If it does not prove practicable to standardize methods and units, brief particulars of the method used will be included in reports from this Laboratory.

One shipment of manufactured oats gave the exceptional acidity figures of 5·8 per cent KH_2PO_4, with a pH of 4·4.

Many determinations were made of the amount of acid-insoluble ash (or sand, as it is commonly called) in flours and meals. No rigid standards are fixed ; though 2 per cent was permitted under emergency war-time conditions, it is felt that in normal times half this figure, or preferably 0·5 per cent, should be fixed as a maximum. A few samples were tested which showed over 1·0 per cent sand and quite a number between 0·5 per cent and 1·0 per cent.

Work on drugs consisted mainly in the standardization of products from the Pharmaceutical Laboratory, such as preparations of Belladonna, Stramonium. Opium, Nux Vomica and Ferric Chloride. Other work under this head involved the identification of a number of drugs and chemicals whose labels had become lost or illegible from various causes.

Water Supplies.—Of the 259 water samples examined the majority were in connection with the Dar es Salaam water supply, though an increasing number of samples are being received from up-country stations.

Routine weekly and monthly analyses were made of the Dar es Salaam water as supplied to the consumer, and of the bore and surface waters which are mixed to give this supply.

Problems associated with the chlorination of Dar es Salaam water involved considerable work throughout the year. Though unusually large amounts of chlorine were fed to the water at the water works, free chlorine could rarely be detected in town tap water. Estimation of residual free chloride in the turbid water presented an unexpected problem in that the standard otolidine method is not always applicable. The normal blue colour appears to be absorbed on the suspension causing the turbidity and tends to settle out as a green precipitate. It is hoped to carry out a detailed investigation of this phenomenon as soon as staff limitations allow. The starch-iodide method, on the other hand, behaves normally, but is not as accurate as the otolidine method when low concentrations of free chlorine are involved.

Inland bore and river waters were examined as regards suitability for boiler feed and drinking purposes and, as mentioned before, an increasing number of samples were received largely in connection with the development of the East African Groundnuts Scheme.

Industrial Analyses.—Experimental work for the Totaquina factory is referred to in more detail elsewhere, including the analyses of cinchona bark on which payment to the planters is based for the factory supply and completed analyses of the finished Totaquina.

Small soap manufacturers continued to submit samples of their products, and seek advice on methods of manufacture.

The qualities of coconut oil and beeswax have been controlled in terms of the relevant government notices.

Advice was also given to other industrial undertakings, mostly in connection with tentative enquiries regarding the possibility of establishing industries.

AGRICULTURAL

PAPAIN

(a) *Assay.*—Continuing the study of methods of assay, the digestion of Hæmoglobin has been finally adopted as the best for routine use. The details of assay have been worked out in the laboratory, and are based on methods originally employed by Anson and Mirsky for Trypsin. The relation between the digestion of Hæmoglobin and the weight of papain taken is not a straight line relationship, but following the examination of a large number of Tanganyika papains in varying concentrations is found to be of the form :—

$$y = k\ (x - c)$$

over a large range of concentrations where k and c are constants, y is activity of the papain, and x the colour produced by the Tyrosine resulting from the Hæmoglobin digestion. The unit of papain has been defined as that amount of papain required to give a colour equal to 0·15mgs. Tyrosine under the conditions described with the colour reagent. The substrate is reasonably easy to prepare and duplicate, and has given consistent results in a very large number of assays. Three hundred and sixty-three routine samples of papain were examined by this method during the year. It is hoped to publish exact details of the assays later but the work of preparing a paper for publication was not possible during 1947. Brief details were released, however, to other chemists interested in the work, and the method was adopted by the Scott Agricultural Laboratories in Kenya.

(b) *Production.*—Apart from the large number of routine samples of Tanganyika papain, investigations have also been completed into the influence of a number of factors upon the manufacture of the commercial product.

At present papain is largely graded on the basis of colour. Whilst the many routine reports show that there is no direct relationship between a colour and proteolytic activity, it is, however, a rough guide to the care which has been taken in drying the latex. Laboratory experiments have shown that at least two factors which can adversely influence colour are :—

(1) The temperature of drying : the higher the temperature of drying in general the darker the colour.

(2) The time which elapses between tapping and drying. It has been shown that there are a number of oxidases and peroxidases present in the fresh juice, and the action of these may adversely affect the colour of dried papain when the latex is allowed to stand in air.

There may be other factors involved. Experience of estates seems to indicate the first tappings from a new plantation are usually dark in colour, but since the tapping of a new plantation is usually a slower and more tedious operation than dealing with one already in production it may be the second factor mentioned above causing the deterioration in colour.

Experiments have also been carried out on the drying of papain relative to its activity. The usual method of drying adopted by the industry in Tanganyika is utilization of a pyrethrum drier. Experiments on drying the papain in closed ovens or cabinets at various temperatures from 37° to 100°C. (99° to 212°F) show that the best results are obtained at the lowest temperature tried. Drying in a current of air increases the tendency to discolour and gives a lower activity, but in spite of a large number of experiments no sample of laboratory papain produced has been so badly discoloured as some of those received from the estates.

The best results in the Laboratory have been obtained with papain dried at 55°C. in vacuo, which gives substantially the same activity as drying in a vacuum desiccator at room temperature. Typical figures obtained are as follows :—

Dried at 100°C :	
Plain	150
Activated	155
Dried at 60°C :	
Plain	158
Activated	205
Dried at 38°C :	
Plain	170
Activated	270
Dried in vacuum at 55°C :	
Plain	274
Activated	410
Dried in vaccum desiccator at room temperature :	
Plain	286
Activated	410

All the above figures have been expressed as the percentage activity compared with a good sample of commercial papain considered to have 100 per cent activity in the plain state.

The terms "plain" and "activated" here refer to the difference in activity of a sample of papain when acting alone and when acting in the presence of some chemical such as sodium cyanide which produces an enhanced activity.

One of the difficulties in the commercial preparation of papain in the pyrethrum drier is the control of temperature with African labour. A bimetallic strip operating an electrical alarm which can be set to ring at any desired temperature was devised in the Laboratory, and put in production by a local engineering firm. Several of these instruments have been ordered by the industry.

(c) *Storage.*—Small ground samples kept in closed tubes in the Laboratory with exposure to several times their own volume of air, undergo rapid deterioration even when kept in the dark. Experiments show that papain kept in sealed tins which are completely filled, shows much better keeping properties, but owing to the need for accelerated tests the study of the deterioration of the laboratory samples is likely to be most valuable to the industry.

A large number of preservatives have been tried, mainly on latex, with the aim of collecting specimens of latex in different parts of Tanganyika, and their preservation during transit to the laboratory. However, no satisfactory preservative has been found. One of the best ways of keeping the samples appears to be at low temperature (say on ice) when little deterioration is noted over a period of days. Sulphur dioxide appears to possess some slight value as a preservative.

It has been discovered that sulphur dioxide also by its destructive action on the oxidases and peroxidases removes the main source of deterioration. If pawpaw latex is treated with sulphur dioxide and subsequently dried either in vacuum at 55°C. or in an incubator at 38°C., the resultant product is superior in colour, smell and activity to a similar sample of untreated juice dried under the same conditions. Too much sulphur dioxide has a deleterious effect on the papain, and too little will not destroy the oxidases. The best method of operation was found to be the ultilization of a saturated solution of sulphur dioxide in water: this solution was mixed with the pawpaw latex. The saturated assayed solution of sulphur dioxide was required in a volume equal to about 5 per cent of sulphur dioxide (SO_2 by weight), calculated on the weight of wet latex, to give optimum effect. Typical figures of papain treated and untreated are given below:—

Dried at 40°C.—In air:	
Treated	260
Untreated	205
Dried at 55°C.—In vacuum:	
Treated	250
Untreated	200

Papain treated by this method has greater stability in storage than untreated papain.

(d) *Control and Marketing.*—In connection with methods of assay, reference may be made to two methods introduced in the United States of America which concerned growers in this Territory. The National Formulary or NF method is based on the digestion of standard meat powder, and it was found that papain having an activity of about 40 per cent (1·8 Dar es Salaam Hæmoglobin Units per milligram of papain) would just about pass the minimum requirements of this test. The second test introduced is that of the A.O.A.C. A standard sample of NF papain representing the minimum standard of quality accepted in the United States of America had very slight activity in the plain state in the Dar es Salaam test, but in the presence of cyanide contained just over 2·2 Hæmoglobin units per milligram, or an activity of 50 per cent of the Tanganyika sample used as a standard in this test. The NF sample in the A.O.A.C. test gave 0·05 A.O.A.C. units per milligram plain, and 0·17 units per milligram when activated. In the A.O.A.C. test, this was slightly inferior to a Tanganyika sample of papain having 3·0 Hæmoglobin units per milligram. Therefore, allowing for some deterioration during transit, exporters have been recommended not to export papain having a plain activity in the Dar es Salaam test of less than 3·0 Hæmoglobin units per milligram (that is an activity of 70 per cent).

A voluntary scheme was initiated whereby exporters could have routine examinations of their samples carried out at an inclusive fee of £3 per ton exported. A number of firms who represent the main exporters had entered this scheme by the end of 1947. Some control of the quality of papain exported is essential if Tanganyika is to maintain its reputation for this product, since the material produced on the estates is subject to large variations in quality. It is also quite apparent from the samples received, and the work done in the Laboratory, that with modifications to the existing process, material of much greater activity than is at present supplied by the industry can be consistently produced. Tanganyika already enjoys a high reputation according to exporters and, if this is so, our prospect of a considerably improved quality will stand the Territory in good stead when the present demand slackens. At the present time the United States of America are the main consumers of Tanganyika papain, but interest in this material has also been displayed by United Kingdom and other European countries.

PYRETHRUM

Apart from the assays done for the Tanganyika industry, some investigations have been completed during the year. The accepted method of assay for pyrethrum flowers is that adopted by the Association of Official Agricultural Chemists in the United States of America. It is tedious and time-consuming. Development of a more rapid method, even if less accurate, would be a great boon if pyrethrum flowers are to be sold on the basis of assay, and that is the modern tendency. Such a method need not be sufficiently accurate to furnish results acceptable to buyer and seller, but should be accurate enough to enable the proceeds of sales to be distributed equitably among members of a co-operative society or farmers' association. Work has been completed on a method formerly employed officially in Kenya and subsequently dropped on account of the erratic results obtained. This method is based on copper reduction. Several modifications have been introduced and the results obtained in the analysis of twenty consecutive samples having a range of total pyrethrin content varying from 1·14 to 1·84 per cent, covering flowers of varying ages of all grades, showed a mean difference of only 0·04 per cent and a maximum difference of 0·05 per cent. These results were so promising that the method was considered sufficiently accurate to employ in investigational work, and was accepted to accelerate the speed of assay in connection with the many problems connected with pyrethrum which still require research. Unfortunately, the expectations were not realized, and the method failed in the analysis of achenes in that it gave results considerably higher than by the standard method. For this reason it was decided to defer publication and adoption until the method could be more closely checked.

Problems investigated during the year have included some preliminary work on achenes. When the pyrethrum flower develops the actual percentage of pyrethrin increases to a maximum, and then falls off with greater maturity. The greater proportion of pyrethrins are found in the achenes. At present the flowers are harvested at about maximum pyrethrin content, but it has been suggested that if flowers were allowed to grow to a later stage of maturity, achenes could be harvested containing a higher percentage of pyrethrins than the flowers at present exported, and the weight of pyrethrin per acre possibly increased. Laboratory work carried out in conjunction with the Tanganyika Pyrethrum Board, indicates that the main assumptions appear to be correct, in that the yield of pyrethrins per acre by the later harvesting of achenes would be about the same as under the present system. This raises the question whether the deterioration of achenes was greater or less than that of flowers at present harvested. Figures on the keeping properties of achenes and flowers gave the following figures :—

	Baled flowers		Achenes
Original value (Pyrethrins on dry matter basis)	1·50%	...	1·85%
Value after three months storage (Pyrethrins on dry matter basis)	1·20%	...	1·44%
Loss after three months storage	20%	...	22%

The use of an anti-oxidant to prevent the deterioration of achenes was also listed for research, but in view of the experiments which have been carried out in Kenya and the possibility of utilizing other methods described below, work on this problem was not put in hand.

The results obtained in destroying oxidases in papain, suggested that a similar approach might be successful with pyrethrum flowers, and it was noted in fact that an Italian paper on this subject had been published in 1941.

Dar es Salaam is not well situated to obtain fresh flowers, but arrangements were made to obtain these flowers by air and process them the same day. The first batch of flower heads so treated gave substantially the same content of pyrethrins in the treated and untreated flowers. The experiment was therefore repeated with a fresh batch of flowers transported on their stalks using rather smaller quantities of sulphur dioxide than in the first experiment. The results of the second series of experiments were most promising. Treated flowers dried under the same conditions as untreated flowers showed about 20 per cent more pyrethrins present. This finding may be of great importance to the pyrethrum industry, since according to the Italian authors, the dried flowers so obtained are more stable. Whether the laboratory method could be easily translated into commercial practice remains to be seen, but before this is attempted the work should be repeated. Owing to the difficulties of obtaining fresh flowers in Dar es Salaam it was agreed with the Scott Agricultural Laboratories that they should undertake work on this subject in Nairobi.

Experiments have also been carried out on the deterioration occurring in flowers harvested and baled by the methods now in use in Tanganyika. These results show a considerable loss to pyrethrins amounting to some 20 per cent in three months. Higher pressure baling and the use of an anti-oxidant might reduce these losses.

Work was also carried out in connection with variations in drying technique on Colonel Notcutt's farm. Varying the time of drying, the best and highest assay results were obtained with twenty-four hours drying, and the lowest assay results with two and a three-quarter hours drying period. The difference between the best and worst samples was, however, only about 5 per cent.

Experiments on the effect of the time factor prior to the drying operations rather unexpectedly gave the highest assay for the longest period of waiting prior to drying. Here again the differences only amount to about 5 per cent and some caution must be observed in interpreting the results.

Experiments were also carried out for the Tanganyika Pyrethrum Board on the manufacture of Smudge Coils, formerly imported from Japan.

SOILS

Few agricultural soils have been examined during the year, but there are indications that a much larger number may be submitted in future.

ESSENTIAL OILS

Essential oils received during the year have included a rather greater range than in previous years, showing the interest in the Territory in the development of this industry.

Oils received during the year have included Lemon Grass, Geranium, Citriodora, Cedar Wood and Cashew nut shell. Some valuable notes from the Colonial Products Research Council were issued to planters interested in developing essential oils in Tanganyika. The high price and nature of this crop is such as to render it an attractive alternative to the relatively expensive agricultural products such as papain and pyrethrum. Problems in connection with the distillation of oils have been submitted for advice during the year, including a sample of geranium oil which turned green in colour, a colour change traced to contamination of the oil by copper.

Customs

The usual miscellaneous samples have been received under this head. The meaning of the term "artificial silk" in the Customs Tariff was defined as including rayon and all artificial fibres. Acceptance of this definition called for the examination of a large number of imported fabrics.

The prohibition of the importation of drinks containing Star Anise oil, led to correspondence on the toxicology of this oil and the meaning of the term. Further clarification appears necessary since Star Anise oil is a listed medicinal in the British Pharmaceutical Codex.

All the samples of condensed milk imported, with one exception, had a minimum fat content of 8 per cent. The attention of the authority concerned was drawn to the three Ordinances dealing with condensed milk which were not consistent among themselves. Steps have been take to harmonise the various legal standards.

FORENSIC WORK

Fifty-five fatal cases of poisoning covering ninety-four samples of viscera were submitted during the year. In ten of these cases, positive reactions for toxic substances were obtained. As would be expected, the majority (seven) of these positive reactions were for alkaloidal substances, with one each for arsenic, kerosene and a barbiturate.

The majority of arrows submitted were coated with the common arrow poison of this Territory, but four arrow heads gave reactions for the presence of *Strophanthus*.

Police work, apart from counterfeit coins, documents and drugs, consisted of various miscellaneous problems. One case concerned the identification of some fibres found near the scene of crime with a garment found on the suspected person.

A second case involved an accident which occurred in an elephant hunt. The cartridges found on the scene of the accident were found to have identical markings to cartridges fired from the rifle of the Game Scout.

In another case, spectrographic examination of the spent bullets from a revolver were found to differ considerably from a supposed lead slug found on the scene of crime.

In another case the question at issue involved the composition of chips of cement found on a vehicle which were examined in comparison with a cement facing of a bridge.

The counterfeiting of ration tickets involved the spectrographic examination of various printing inks as well as the examination of these inks by other methods.

These varying crime cases were examined in consultation with officers from the Criminal Investigation Department and the findings illustrated by photographs and spectrograms.

Lloyds Agents during the year submitted samples of the packing materials of damaged consignments, with a view to assessing the cause (rain, tap or sea water) and in many cases laboratory findings were conclusive.

BIOCHEMICAL WORK

Work under this head calls for no special comment in that it consisted of the usual run of clinical material from the hospitals. Little work was done on nutrition during the year other than vitamin determinations made in response to specific requests.

PUBLIC WORKS DEPARTMENT

Apart from the water samples referred to elsewhere, soils were submitted in connection with road maintenance, construction of aerodromes, and other constructional work. Samples of lime examined in connection with government building tenders continued to show extremely poor quality. Slaked lime containing more than 30 per cent free lime (CaO) is the exception rather than the rule. Discussions were held with the Public Works Department with a view to improving the quality of supplies of lime and other building materials, a matter of increased importance now that cement is likely to be in even shorter supply.

MISCELLANEOUS

In addition to advisory services given to private firms and departments, the Government Chemist attended metings of the East African Industrial Research Board, and make a short tour of the papain-producing areas in the Northern Province.

NEW LEGISLATION

The Extermination of Mosquitoes Ordinance. The Extermination of Mosquitoes (Application: Iringa District) Order, 1947. Government Notice No. 148 of 1947.

The Infectious Disease Ordinance. The Infectious Disease (Declaration of Infected Area: Mbulu District) (Amendment) Order, 1947. Government Notice No. 187 of 1947.

The Mental Diseases Ordinance. The Mental Hospitals (Establishment: Msasani) Order, 1947. Government Notice No. 100 of 1947.

The Mining (Controlled Areas) Ordinance. The Mining (Controlled Areas) (Public Health) (Amendment) Regulations, 1947. Government Notice No. 125 of 1947.

The Pharmacy and Poisons Ordinance. The Pharmacy and Poisons (Prohibition of Importation, etc. of Human Abortifacients) Order, 1947. Government Notice No. 171 of 1947.

The Pharmacy and Poisons Ordinance. The Poisons List (Amendment) Order, 1947. Government Notice No. 191 of 1947.

The Pharmacy and Poisons Ordinance. The Poisons (Amendment) Rules, 1947. Government Notice No. 209 of 1947.

The Townships Ordinance. The Township (Amendment) Rules, 1947. Government Notice No. 194 of 1947.

PUBLICATIONS BY MEMBERS OF THE STAFF

L. H. CANE: "Patent Urachus Causing Acute Retention of Urine, with a note on a Continuous-Suction Apparatus." *East African Medical Journal*, Vol. XXIV, No. 10.

W. D. RAYMOND: "Notes on a Poisonous East African Species of Wild Cucumber (*Cucumis oculeatus*)." *East African Medical Journal*, XXIV, No. 12.

D. BAGSTER WILSON: "Malaria in Madagascar." *East African Medical Journal*, Vol. XXIV, No. 4.

W. A. YOUNG, A. G. FARR and A. MCKENDRICK: "Aetiology in respect of a Case of Follicular Hyperkeratosis." *East African Medical Journal*, Vol. XXIV, No. 3.

L. H. CANE: "A Case of Bilateral Syme's Amputation." *British Medical Journal*, Vol. ii, p. 211, 9th August, 1947.

A. W. GABATHULER (with M. J. GABATHULER): "A Report of Onchocerciasis in the Ulanga District." *East African Medical Journal*, Vol. XXIV, No. 5.

Dar es Salaam,
September, 1948

A. MCKENZIE,
Acting Director of Medical Services

TABLE 1—ESTABLISHMENT

POSTS	ESTABLISHMENT				STRENGTH 31ST DECEMBER 1947			
	African	Asian	Euro-pean	Total	African	Asian	Euro-pean	Total
Professional :								
1. Administrative, Territorial and Provincial	—	—	13	13	—	—	9	9
2. Clinical—Specialists, Other Medical Personnel	6	65	53	124	5	57	39	101
3. Dental	—	—	5	5	—	—	4	4
4. Health and epidemiology—Medical	—	—	7	7	—	—	4	4
5. Health and epidemiology—Nursing, etc.	—	—	6	6	—	—	4	4
6. Laboratories	—	—	5	5	—	—	4	4
7. Nursing—general—female ...	—	—	61	61	—	—	54	54
8. Nursing—special—male ...	—	2	2	4	—	2	3	5
9. Nursing—special—female ...	—	1	5	6	—	—	5	5
10. Pharmacy	—	14	6	20	—	13	5	18
Technical :								
11. Administrative	—	—	3	3	—	—	3	3
12. Clerical	53	30	6	89	37	30	4	71
13. Clinical	—	15	—	15	1	2	—	3
14. Dental	—	—	2	2	—	—	2	2
15. Health	1	—	26	27	1	—	16	17
16. Hospitals—general and special...	1	2	7	10	1	1	6	8
17. Laboratories	1	—	3	4	1	—	3	4
18. Pharmacy	6	2	—	8	4	2	—	6
19. Training and Industrial ...	1	—	2	3	1	—	2	3
Auxiliary :								
20. Clinical	108	—	—	108	98	—	—	98
21. Health	140	8	—	148	105	8	—	113
22. Laboratories	26	—	—	26	26	—	—	26
23. Students—Hospital Assistants ...	30	—	—	30	26		—	26
24. Students—Laboratory Assistants	10	—	—	10	10	—	—	10
25. Hospital Orderlies, Ayahs ...	—	—	—	—	1,020	—	—	1,020
26. Sanitary Laboratory—Anti-Mosquito Staff	—	—	—	—	1,401	—	—	1,401
27. Laboratory Attendants	—	—	—	—	10	—	—	10
28. Telephone Operators	6	—	—	6	6	—	—	6
29. Motor Drivers	21	—	—	21	21	—	—	21
30. Messengers ... ... }	—	—	—	—	722	—	—	722
31. Domestic Staff ... ... }								
Total ...	410	139	212	760	3,496	115	167	3,778

TABLE 2—NEWLY APPOINTED OFFICERS ARRIVED DURING 1947

Name	Appointment	Date of Arrival	Remarks
J. R. C. Spicer, M.B., B.S. (Lond.) M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.T.M. & H. (Eng.)	Senior Medical Officer	18.12.47	On transfer from Uganda.
A. W. Williams, M.D. (Cantab.), M.R.C.P. (Lond.), M.R.C.S. (Eng.), D.T.M. & H. (Eng.)	Specialist	21.6.47	On transfer from Uganda.
E. G. R. Butler, M.B., B.Ch., B.A.O. (Dub.)	Medical Officer	16.10.47	
W. J. M. Evans, M.B., B.S. (Lond.), M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.P.H. (Wales)	Medical Officer	23.4.47	
C. G. F. Smartt, M.R.C.S. (Eng.), L.R.C.P. (Lond.)	Medical Officer	7.1.47	
J. P. Lane, M.B., B.Ch., B.A.O. (N.U. Irel.), F.R.C.S. (Edin.)	Medical Officer	4.1.47	
H. R. Hudd, M.B., B.Ch. (Wales), M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.A. (Eng.)	Medical Officer	21.7.47	
J. C. Bryce, M.B., B.S. (Lond.), M.R.C.S. (Eng.), L.R.C.P. (Lond.)	Medical Officer	10.3.47	
R. J. Pitchford, M.R.C.S. (Eng.), L.R.C.P. (Lond.)	Medical Officer	31.8.47	
A. J. McKendrick, M.B., Ch.B. (Glas.)	Medical Officer	6.3.47	
N. A. Duncan, M.R.C.S. (Eng.), L.R.C.P. (Lond.)	Medical Officer	14.1.47	
I. Laufer, M.D. (Parma)	Medical Officer	7.10.47	
Miss I. P. Mackenzie, M.B., Ch.B., D.P.H. (Edin.)	Woman Medical Officer	21.6.47	
Miss H. E. McNamara, M.D. (Toronto), L.M.C.C.	Woman Medical Officer	24.11.47	
J. P. P. Mackay, M.B., Ch.B. (Birm.), D.P.H. (Lond.), D.T.M. & H. (Eng.)	Pathologist	22.5.47	
Miss J. I. Pedley, C.S.P.	Physiotherapist	28.5.47	
Mrs. M. M. Dudley	Sister Housekeeper	17.6.47	
E. W. R. Parks, M.P.S.	Asst. Pharmacist	11.12.47	
R. C. Telling, A.I.M.L.T.	Laboratory Supt.	14.1.47	
Miss H. M. Dewey, M.Sc. (Lond.)	Woman Nutrition Officer	27.9.47	
F. S. L. Barnard	Health Inspector	25.9.47	
C. J. Lodge	Health Inspector	24.3.47	
F. Wilson	Health Inspector	6.3.47	
J. E. Rose	Health Inspector	26.7.47	
A. Fox	Health Inspector	12.10.47	
F. A. Knowles	Health Inspector	10.3.47	
Miss E. M. Brooks	Female Mental Nurse	12.10.47	
Miss N. Milborne	Female Mental Nurse	11.12.47	
G. Lennox	Male Mental Nurse	23.4.47	
N. W. Davy	Male Mental Nurse	8.10.47	
Mrs. P. Banks	Nurse	17.6.47	Tuberculosis Hospital.
D. F. Heath	Secretary	20.11.47	
C. H. Cook	Stores Accountant	1.3.47	
Miss E. D. Terry	Woman Administrative Assistant	20.5.47	Seconded from Provincial Admn.
Miss S. B. Macfarlane	Stenographer	10.7.47	
Mrs. R. Beckham	Hospital Secretary	27.11.47	
E. C. Banks	Industrial Instructor	17.6.47	Tuberculosis Hospital.
J. Johnson	Night Superintendent	8.10.47	
Mrs. N. B. McKenzie	Librarian	1.1.47	
E. A. Blake	Malarial Field Asst.	16.12.47	
P. N. Jenkins	Malarial Field Asst.	5.10.47	

Fifteen Nursing Sisters arrived for duty in the Territory during the year.

TABLE 3—PROMOTIONS

Name	Appointment From	Appointment To	Effective Date
J. R. C. Spicer	M.O.	*S.M.O.	23.9.47
N. Chilton	M.O.	S.M.O.	7.4.47
A. W. Williams	M.O.	*Specialist	23.5.47
Miss L. E. Salter	Senior Nursing Sister	Matron, Grade II	1.9.47
J. A. Salter	Health Inspector	Senior Health Inspector	1.1.47
R. B. Owen	Health Inspector	Senior Health Inspector	1.9.47

*On transfer from Uganda.

TABLE 3A—HONOURS

Miss A. I. Leighton, Senior Health Visitor—M.B.E.
Maynard Mbella, African Hospital Assistant—Imperial Service Medal.
James Addison Ntukula, African Sanitary Inspector—British Empire Medal.

TABLE 4—ACTING APPOINTMENTS AND REVERSIONS

Name	Substantive Appointment	Acting Appointment	Effective Date	Date of Reversion
A. McKenzie	Dy. D.M.S.	D.M.S.	1.1.47	24.1.47
Miss L. E. Salter	Senior Nursing Sister	Matron, Grade II	1.1.47	1.9.47
C. E. Thomas	Asst. Pharmacist	Pharmacist	1.1.47	15.1.47
J. P. P. Mackey	Pathologist	Senior Pathologist	30.5.47	29.12.47
W. J. M. Evans	Medical Officer	A.D.M.S.	9.6.47	31.12.47
G. A. Wilson	Medical Officer	Specialist	3.8.47	31.12.47
W. L. Lister	Medical Officer	Senior Medical Officer	9.8.47	31.12.47
H. Ehrlich	Medical Officer	Senior Medical Officer	15.8.47	21.12.47
G. H. Payne	Asst. Government Chemist	Government Chemist	1.11.47	31.12.47
W. A. Willox	Senior Health Inspector	Chief Health Inspector	1.11.47	31.12.47
K. Edmundson	Senior Medical Officer	D.D.M.S.	14.11.47	31.12.47
G. A. MacGregor	Medical Officer	Senior Medical Officer	17.11.47	31.12.47

TABLE 5—RETIREMENTS, RESIGNATIONS, ETC.

Name	Designation	Effective Date	Remarks
Dr. P. P. D. Connolly	Senior Medical Officer	22.11.47	Leave pending retirement
Dr. K. C. Charron	Specialist	3.8.47	Leave pending resignation.
Dr. J. F. Jarvis	Medical Officer	31.8.47	Transferred to Kenya.
Dr. P. E. C. Manson-Bahr	Medical Officer	4.1.47	Leave pending resignation.
Dr. A. M. Barnett	Medical Officer	1.8.47	Resignation.
Dr. N. L. Mills	Medical Officer	5.8.47	Leave pending resignation.
Miss M. D. Miller	Woman Medical Officer	8.11.47	Leave pending resignation.
H. Rawnsley	Dental Surgeon	4.1.47	Resignation.
Miss M. A. Shelton	Senior Nursing Sister	1.3.47	Leave pending retirement.
Miss A. I. Leighton	Senior Health Visitor	1.3.47	Leave pending retirement.
Miss M. G. Blower	Senior Nursing Sister	10.4.47	Leave pending resignation.
Miss E. G. Hegan	Health Visitor	1.5.47	Resignation.
Miss V. V. E. Ashley	Physiotherapist	9.5.47	Leave pending resignation.
C. H. Sargent	Health Inspector	20.6.47	Pending termination of appointment.
B. C. Wilmot	Health Inspector	22.6.47	Transferred to Labour Department.
Miss J. Fraser	Female Mental Nurse	1.5.47	Resignation.
Miss H. L. McKay	Stenographer	24.3.47	Transferred to Kenya.
F. R. J. Silk	Night Superintendent	24.7.47	Leave pending termination of appointment.
P. A. Shields	Night Superintendent	1.11.47	Leave pending termination of appointment.

Seven Nursing Sisters left the service during the year.

TABLE 6—MEDICAL AND DENTAL PRACTITIONERS RESIDENT ON 31st DECEMBER 1947

PROVINCES	GOVERNMENT SERVICE					NON-GOVERNMENT							
	Euro-pean	Asian	African	R. or L.		Euro-pean	Asian	R. or L.		M.	RC.	PP.	I.
Central	2	5	Nil	2	5	13	Nil	13	Nil	3	1	Nil	9
Eastern...	19+1D	7	1	21+1D	6	7+1D	12	18+1D	1	1	Nil	18+1D	Nil
Lake	7	7	1	7	8	4	3	5	2	2	Nil	3	2
Northern	6	4	Nil	6	4	9+1D	2	11+1D	Nil	1	4	6+1D	Nil
Southern	3	5	Nil	5	3	3	1	3	1	3	Nil	Nil	1
Southern Highlands	5	1	2	5	3	5	1	2	4	1	2	2	1
Tanga	6+1D	4	Nil	6+1D	4	9+1D	2	7+1D	4	1	3	7+1D	Nil
Western	3+1D	7	Nil	5+1D	5	2+1D	Nil	2+1D	Nil	Nil	Nil	1D	2
Total ...	51+3D	40	4	57+3D	38	52+4D	21	61+4D	12	12	10	36+4D	15

R. = Registered.
M. = Mission.
RC. = Refugee Camp.
D. = Dentist.

L. = Licensed.
PP. = Private Practice.
I. = Employed in Industry.

TABLE 7—BED DISTRIBUTION—GOVERNMENT HOSPITALS AND DISPENSARIES

Province	Number of Beds at 1st January 1947				Beds added or abolished during year (marked + or –)				Number of Beds at 31st December 1947				Daily Average Occupied			
	Euro-pean	Asian	African	Total	Euro-pean	Asian	African	Total	Euro-pean	Asian	African	Total	European	Asian	African	Total
Central	5	10	250	265	—5	–	+2	—5 +2	–	10	252	262	·08	1·35	171·71	173·14
Eastern	43	58	755	856	–	–	—11	—11	43	58	744	845	16·20	32·45	431·92	480·57
Lake	10	18	648	676	–	+4	—4	—4 +4	10	22	644	*676	1·73	3·25	436·08	441·06
Northern	27	10	497	534	–	–	—11	—11	27	10	486	523	11·91	2·22	503·36	612·69
Southern	5	8	273	286	–	—2	—17	—19	5	6	256	267	·55	1·40	140·60	142·55
Southern Highlands	20	11	299	330	+1	+2	–	+3	21	13	299	333	6·89	·99	239·07	246·95
Tanga	12	14	609	635	+6	—4	—5	—9 +6	18	10	604	632	7·60	4·10	375·84	387·54
Western	9	12	394	415	–	–	+6	+6	9	12	400	421	3· 22	1·20	179·84	184·26
Total ...	131	141	3,725	3,997	—5 +7	—6 +6	—48 +8	—59 +21	133	141	3,685	3,959	48·18	46·96	2,476·62	2,668·76

*Includes 12 Hostel Beds of Native Authority.

TABLE 8—IN- AND OUT-PATIENTS—GOVERNMENT HOSPITALS AND DISPENSARIES

Province	In-Patients														Out-Patients			
	Remaining at 1.1.47		Admitted during year		Cured		Relieved		Not Improved		Deaths		Remaining at 31.12.47		Total New Cases		Daily Average New Cases	
	E.	N-E.	E.	N-E.	E.	N-E.	E.	N-E.	E.	N-E.	E.	N-E.	E.	N-E.	E.	N-E.	E	N-E.
Central	–	155	6	5,278	5	3,758	1	930	–	327	–	260	–	158	666	82,135	1·8	222·7
Eastern	11	526	728	11,950	506	5,422	164	5,431	40	554	6	537	33	527	3,293	179,407	10·6	512·6
Lake	4	339	111	13,619	101	9,927	9	2,528	2	576	2	434	–	409	760	165,772	2·0	465·8
Northern	14	482	512	12,407	419	9,197	79	1,982	13	695	7	503	6	512	2,496	82,382	6·84	240·6
Southern	–	125	22	2,925	17	2,291	2	451	1	108	1	90	–	116	193	70,016	·5	192·0
Southern Highlands	7	198	275	5,806	202	4,465	49	829	13	219	7	244	10	237	961	113,694	2·6	294·4
Tanga	7	329	368	8,753	236	7,162	119	927	13	285	2	389	5	318	1,368	89,294	9·8	246·6
Western	6	209	114	5,083	78	2,786	23	1,852	15	117	–	311	4	192	571	171,273	1·5	577·8
Total ...	49	2,363	2,136	65,821	1,564	45,008	446	14,930	97	2,881	25	2,768	58	2,469	10,308	53,973	35·64	2,752·5

E. = European.
N-E. = Non-European.

953,973

TABLE 9—MATERNITY AND CHILD WELFARE SERVICES

A. GOVERNMENT

PROVINCE	STAFF				Total Attendances	Daily Average	First Attendances Mothers	First Attendances Children	Total Confinements	Normal Deliveries	Miscarriages and Abortions	Abnormal Deliveries	Live Births	Still Births	Deaths of Mothers	Deaths of live Infants (during puerperium)
	Qualified Medical	Auxiliary Medical	Qualified Nursing	Auxiliary Nursing												
Central	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Eastern	2	1	1	23	31,958	105	3,441	1,517	674	595	31	38	594	48	2	12
Lake	–	–	–	7	17,064	47	477	5,667	534	436	76	24	217	4	3	5
Northern	–	–	–	–	–	–	–	–	191	148	18	25	175	9	4	4
Southern	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Southern Highlands	–	–	–	–	1,305	4	437	108	309	248	35	16	286	7	8	8
Tanga	1	–	1	9	32,178	88	581	850	299	268	19	12	289	10	1	8
Western	–	–	2	20	12,928	35	1,914	1,095	1,114	984	55	75	966	68	12	27
Total ...	3	1	4	59	95,433	279	6,850	9,237	3,121	2,679	234	190	2,527	146	30	64

Most Provinces do not have separate staff for Maternity work. Those shown are full-time workers on Maternity and Child Welfare service only. Figures are incomplete as this is the first year returns have been required in this form.

TABLE 9 (*contd.*)—MATERNITY AND CHILD WELFARE SERVICES

B. MISSION

PROVINCE	*STAFF				Total Attendances	Daily Average	First Attendances Mothers	First Attendances Children	Total Confinements	Normal Deliveries	Miscarriages and Abortions	Abnormal Deliveries	Live Births	Still Births	Deaths of Mothers	Deaths of Live Infants
	Qualified Medical	Auxiliary Medical	Qualified Nursing	Auxiliary Nursing												
Central	3	1	10	10	27,861	78	4,821	3,387	1,359	1,205	83	71	1,042	35	6	26
Eastern	2	–	5	3	2,513	7	2,193	2,117	230	213	9	8	212	6	–	7
Lake	1	2	11	47	56,777	154	1,087	1,181	2,052	1,721	200	131	1,155	43	3	20
Northern	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Southern	1	–	15	7	1,291	4	16	14	762	324	39	52	379	17	–	8
Southern Highlands	–	–	2	4	5,697	151	325	3,005	191	151	13	27	203	1	11	2
Tanga	2	–	6	29	1,054	–	–	–	1,054	944	29	81	1,073	58	7	35
Western	–	1	6	27	35,600	108	3,737	1,497	1,277	1,126	52	99	1,192	58	7	80
Total ...	9	4	55	127	130,793	502	12,179	11,201	6,925	5,684	425	469	5,256	218	34	178

Figures returned by Missions are very incomplete. Totals may include figures not differentiated in other columns.
*Most of the staff enumerated are also employed on general medical work.

C. NATIVE AUTHORITY

Provinces	Special Staff	Total Attendances	Daily Average	First Attendances Mothers	First Attendances Children	Total Confinements	Normal Deliveries	Miscarriages and Abortions	Abnormal Deliveries	Live Births	Still Births	Deaths of Mothers	Deaths of Live Infants
Lake	?	7,363	20	889	111	709	584	85	40	584	60	8	28
Tanga	2	?	?	706	?	416	396	18	2	?	?	?	?
Western	5	3,255	9	837	364	371	357	5	9	366	2	1	1
Total ...	7	10,618	29	2,432	475	1,496	1,337	108	51	950	62	9	30

Figures returned are incomplete and approximate only.

TABLE 10—MISSION MEDICAL SERVICES

Province	Number of Staff						Beds				In-patients treated yearly							Out-patients new cases			
											Male			Female							
	Medical Officers	Hospital Assistants and Dispensers	State Registered Nurses	Unregistered Nurses (European)	Certificated Nurses (African)	Nursing Orderlies and Dressers (Un-Certificated)	European	Asian	African	Total	European	Asian	African	European	Asian	African	Total	European	Asian	African	Total
Central	3	3	18	–	–	117	4	10	274	288	6	11	913	13	21	2,862	3,826	28	148	129,771	129,947
Eastern	2	3	6	–	–	9	–	–	239	239	18	3	1,300	10	–	1,121	2,452	28	33	19,909	19,970
Lake	2	2	17	18	8	70	10	64	468	542	6	56	556	–	84	446	1,148	46	350	189,960	190,356
Northern ...	1	2	4	3	–	12	–	6	125	131		Not Differentiated					1,224	38	470	53,135	53,643
Southern	3	17	30	7	5	117	30	28	1,120	1,178	63	124	–	26	76	–	*21,219	110	122	270,152	270,384
Southern Highlands ...	1	–	6	4	1	19	2	–	210	212	2	–	1,449	–	–	1,796	3,247	54	21	32,738	32,813
Tanga	2	26	12	2	–	68	2	–	327	329	–	–	1,088	19	3	2,504	*4,913	21	70	41,693	41,784
Western	–	8	10	6	1	34	–	12	182	194	–	34	1,254	–	41	1,279	2,608	50	763	209,583	210,396
Total ...	14	61	103	40	15	446	48	120	2,945	3,113	95	228	6,560	68	225	10,008	40,637	375	1,977	946,941	949,293

*Includes patients not classified into male and female.

TABLE 10A—DISTRIBUTION OF EUROPEAN MISSION MEDICAL STAFF BY NATIONALITIES

Province	British	German	American	Swiss	Italian	Swedish	Dutch	Canadian	Danish	French	Belgian	Polish
Central	8	–	6	–	6	–	–	–	–	–	–	–
Eastern	4	1	–	4	–	–	–	–	–	–	–	–
Lake	1	4	7	–	–	–	1	2	–	–	–	–
Northern	4	1	–	–	–	–	–	–	–	–	–	–
Southern	13	18	–	9	–	–	1	–	–	2	–	2
Southern Highlands	2	3	–	–	4	2	–	–	–	–	–	–
Tanga	?	?	2	?	?	?	?	?	?	?	?	?
Western	2	4	–	–	–	7	3	1	2	–	2	–
Total ...	34	31	15	13	10	9	5	3	2	2	2	2

TABLE 11—NATIVE AUTHORITY MEDICAL SERVICES

PROVINCE	Number of Dispensaries	STAFF			Beds if Any	First Attendances	
		A.M.A.	T.D.	S.		1946	1947
Central	35	–	36	35	121	124,294	174,155
Eastern	59	9	67	60	–	247,659	265,469
Lake	94	75	35	92	91	560,061	609,513
Northern	41	4	41	42	–	99,362	95,625
Southern	22	–	25	7	73	73,813	101,935
Southern Highlands ...	49	41	10	49	–	190,074	205,509
Tanga	32	2	25	9	13	95,427	79,266
Western...	29	4	26	29	21	58,921	77,624
Total ...	361	135	265	323	319	1,499,611	1,609,096

A.M.A. = African Medical Auxiliary.
T.D. = Tribal Dresser.
S. = Sweeper.

TABLE 12—GENERAL DISEASES

In and Out-Patients, Government Hospitals and Dispensaries

Diseases	Cases In-patients	Deaths In-patients	Cases Out-patients	Total Cases In and Out-patients	Group Totals		Percentage of Group to Total Cases	Percentage of Group to Total Deaths
					Cases	Deaths		
Group I.—Infective and Parasitic Diseases:								
Typhoid and Paratyphoid Fevers ...	291	46	74	365				
Undulant Fever ...	4	1	–	4				
Cerebro-Spinal Meningitis ...	315	145	24	339	(a) Blood Inoculation Group.			
Malignant Pustule and Anthrax ...	84	5	140	224				
Tuberculosis of the Respiratory System ...	983	226	3,257	4,240	131,621	334	13·39	11·79
Other forms of Tuberculosis:								
(a) Bones and Joints ...	86	6	228	314				
(b) Glands and Intestines ...	210	13	1,503	1,713	(b) Intestinal and Excremental Group.			
Leprosy ...	171	8	289	460				
Dysentery: (a) Amœbic ...	259	21	692	951	67,858	286	6·90	10·09
(b) Bacillary ...	151	16	603	754				
(c) Undefined ...	295	22	2,395	2,690				
Malaria: (a) Benign Tertian ...	804	60	1,016	1,820	(c) Surface Inoculation and Droplet Infection Group.			
(b) Quartan ...	44	18	1,088	1,132				
(c) Subtertian ...	7,795	131	48,151	55,946	135,146	473	13·74	16·70
(d) Undefined ...	5,319	55	61,483	66,802				
(e) Blackwater Fever ...	38	12	8	46				
Trypanosomiasis ...	313	28	274	587	(d) Other Infectious and Protozoal Diseases.			
Venereal Diseases: (a) Syphilis ...	2,364	23	38,897	41,261				
(b) Gonorrhœa ...	2,514	5	20,059	22,573	8,116	78	0·83	2·75
(c) Other Venereal Diseases ...	317	2	2,779	3,096				
Relapsing Fever ...	1,694	27	3,594	5,288				
Yaws ...	714	6	60,052	60,766				
Smallpox ...	288	39	96	384				
Ankylostomiasis ...	2,633	152	23,720	26,353				
Schistosomiasis ...	620	10	9,217	9,837				
Other helminthic diseases ...	789	18	26,115	26,904				
Other infective or parasitic diseases ...	1,585	76	6,307	7,892	342,741	1,171	34·86	41·33
Group II.—Cancer and Other Tumours:								
Cancer of the liver and biliary passages ...	30	12	72	102				
Other malignant Tumours ...	137	40	31	168				
Non-malignant Tumours ...	192	2	394	586				
Unspecified Tumours ...	161	9	280	441	1,297	63	0·13	2·22
Group III.—Nutritional, Glandular and General Diseases:								
Rheumatic Conditions ...	664	2	22,179	22,843				
Diabetes ...	30	1	46	76				
Diseases of the Endocrine Glands ...	46	1	149	195				
Scurvy ...	8	1	27	35				
Beriberi ...	19	4	17	36				
Pellagra ...	22	2	77	99				
Other Deficiency Diseases ...	218	19	1,360	1,578	24,862	30	2·53	1·06
Carried forward	32,207	1,264	336,693	368,900	368,900	1,264	37·52	44·61

TABLE 12—GENERAL DISEASES—*contd.*

In- and Out-Patients, Government Hospitals and Dispensaries

Disease	Cases In-patients	Deaths In-patients	Cases Out-patients	Total Cases In and Out-patients	Group Totals		Percentage of Group to Total Cases	Percentage of Group to Total Deaths
					Cases	Deaths		
Brought forward	32,207	1,264	336,693	368,900	368,900	1,264	37·52	44·61
Group IV.—Diseases of the Blood and Blood-forming Organs:								
Anaemias (a) Hyperchromic ...	92	11	1,495	1,587				
(b) Hypochromic ...	349	62	4,904	5,253				
Other Diseases of the Blood and Blood-forming Organs ...	210	22	3,393	3,603	10,443	95	1·06	3.35
Group V.—Acute and Chronic Poisoning ...	20	4	4	24	24	4	0·00	0·14
Group VI.—Diseases of the Nervous System and Sense Organs:								
Mental Diseases ...	90	3	176	266				
Trachoma ...	186	—	906	1,092				
Other Diseases of Vision ...	993	—	44,508	45,501				
Diseases of the Ear and Mastoid ...	243	4	15,115	15,358				
Other Diseases of the Nervous System ...	768	56	25,376	26,144	88,361	63	8·99	2·22
Group VII.—Diseases of the Circulatory System:								
Heart Disease ...	269	54	1,014	1,283				
Other Diseases of the Circulatory System ...	337	30	2,262	2,599	3,882	84	0·39	2·97
Group VIII.—Diseases of the Respiratory System:								
Bronchitis ...	1,474	23	94,336	95,810				
Pneumonia ...	3,606	333	2,518	6,124				
Other Diseases of the Respiratory System ...	1,020	51	25,354	26,374	128,308	407	13·05	14·37
Group IX.—Diseases of the Digestive System:								
Diarrhœa and Enteritis: (a) Under two years ...	267	22	7,835	8,102				
(b) Two years and over...	1,104	86	14,266	15,370				
Hernia, Intestinal Obstruction...	1,032	60	1,314	2,346				
Cirrhosis of the Liver ...	289	54	250	539				
Other Diseases of the Digestive System ...	2,412	128	109,832	112,244	138,601	350	14·16	12·35
Group X.—Diseases of the Urinary and Genital System: (not venereal or connected with pregnancy or the puerperium).								
Diseases of the Kidney, Ureter and Bladder ...	589	58	2,243	2,832				
Diseases of the Male Genital Organs ...	2,133	28	3,402	5,535				
Diseases of the Female Genital Organs ...	766	20	3,555	4,321	12,638	106	1·30	3·74
Group XI.—Diseases of Pregnancy:								
Deliveries ...	2,164	35	78	2,242				
Abortions and Miscarriages ...	414	7	164	578				
Toxaemias of Pregnancy ...	92	4	603	695				
Other conditions of the Puerperal State ...	353	25	1,032	1,385	4,900	71	0·50	2·51
Group XII.—Diseases of the Skin and Cellular Tissue:								
Ulcers ...	5,107	26	77,952	83,059				
Other Skin Conditions ...	3,227	42	47,621	50,848	133,907	68	13·62	2·40
Carried forward	61,813	2,512	828,201	890,014	890,014	2,512	90·59	88·66

TABLE 12—GENERAL DISEASES—*contd.*

In- and Out-Patients, Government Hospitals and Dispensaries

Disease	Cases In-patients	Deaths In-patients	Cases Out-patients	Total Cases In and Out-patients	Group Totals		Percentage of Group to Total Cases	Percentage of Group to Total Deaths
					Cases	Deaths		
Brought forward	61,813	2,512	828,201	890,014	890,014	2,512	90·59	88·66
Group XIII.—Diseases of the Bones and Organs of Locomotion:								
Diseases of Bones, etc. (excluding T.B.)	1,120	20	17,804	18,924	18,924	20	1·92	0·71
Groups XIV and XV.—Congenital Malformations and Diseases Peculiar to the First Year of Life:								
Malformations, Premature Birth and Injury at Birth	14	8	48	62				
Congenital Debility	23	16	189	212				
Diseases peculiar to the First Year of Life	20	2	31	51	325	26	0·03	0·92
Group XVI.—Senility and Old Age	59	26	170	229	229	26	0·02	0·92
Group XVII.—Violence and External Causes:								
Suicide	47	4	240	287				
Homicide	704	19	2,766	3,470				
Accidents	5,638	198	51,562	57,200	60,957	221	6·20	7·80
Group XVIII.—Ill-defined Causes	966	28	11,225	12,191	12,191	28	1·24	0·99
Total	70,404	2,833	912,236	982,640	982,640	2,833	100·00	100·00

TABLE 13—HEALTH OF PRISONERS

Provinces	Daily average in Prison	Number admitted to Hospital	Daily average in Hospital	Daily average on Sick List	Deaths
Central	710·9	306	1·4	29·5	7
Eastern	1,716·1	1,142	23·7	66·0	18
Lake	916·8	295	6·4	20·3	9
Northern	311·3	165	2·7	34·7	3
Southern...	140·1	19	1·3	14·9	–
Southern Highlands ...	263·0	45	·2	18·6	3
Tanga	618·0	199	3·8	24·7	7
Western	699·6	243	4·6	28·3	8
Total ...	5,375·8	2,414	44·1	237·0	55

TABLE 14—VITAL STATISTICS—POPULATION

Provinces	EUROPEAN			ASIAN			AFRICAN			Grand Total
	Males	Females	Total	Males	Females	Total	Males	Females	Total	
Central	786	631	1,417	2,437	2,050	4,487	276,780	279,135	555,915	561,819
Eastern	1,324	864	2,188	12,904	10,400	23,304	321,600	331,350	652,950	678,442
Lake	491	281	772	4,678	3,304	7,982	794,403	827,817	1,622,220	1,630,974
Northern	887	852	1,739	2,667	1,848	4,515	206,600	207,800	414,400	420,654
Southern	449	199	648	1,526	1,240	2,766	300,542	350,639	651,181	654,595
Southern Highlands	581	430	1,011	1,537	1,277	2,814	262,500	298,500	561,000	564,825
Tanga	589	530	1,119	5,824	5,162	10,986	220,231	195,473	415,704	427,809
Western	454	238	692	2,837	1,774	4,611	465,090	576,819	1,041,909	1,047,212
Total ...	5,561	4,025	9,586	34,410	27,055	61,465	2,847,746	3,067,533	5,915,279	5,986.330

G,P

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